OPERATING MANAGEMENT'S
OWN MAGAZINE . . .

CHEMICAL PROCESSING®

with PROCESS DYNAMICS

NOVEMBER 1961

Benefits – The Fringe Thickens

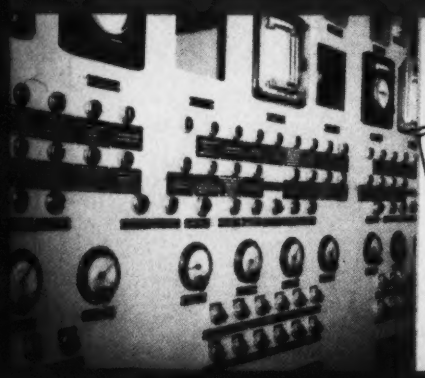
This operating expense helps squeeze profits; yet employees do not appreciate its dollar value . . 27

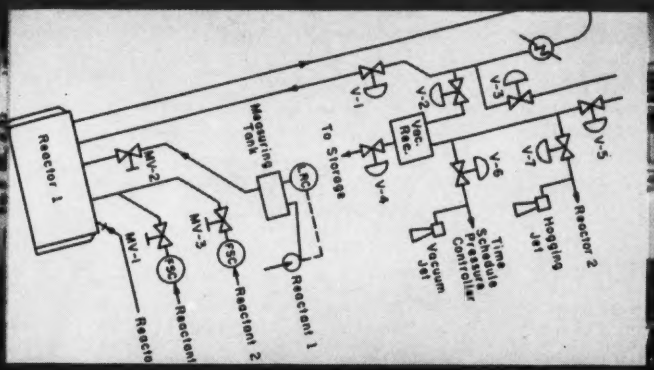
Platinum Finds New Uses in CPI

Platinum-titanium chlorine electrode promises large savings; other developments forthcoming . . 31

Big payoff at Monsanto—

PROGRAMMERS BOOST BATCH OUTPUT





Production leaps 25%. . . thanks to unique end-point-programming method . . . . . page 34

CHEM SHOW DIRECTORY
. . . 84-page tear-out guide . . . page 75

1.00 the copy
PUTMAN PUBLICATION
xecutive Magazines for Industry'

Excitement... about a new chemical fresh from Research and Development!

B&A® SULFAMIDE

Recently, one of our ads went on a "fishing expedition" to explore possible uses for a number of new chemicals. *Among them was B&A Sulfamide.* So much interest was expressed in Sulfamide that we are taking this opportunity to tell you more about it.

B&A Sulfamide is similar to urea in many of its reactions, except that it is more acidic, and can act as a dibasic acid. Here are twelve properties and reactions of this interesting new chemical. Do they give you some ideas of your own?

Nitration

$NH_2SO_2NH_2 + HNO_3 \longrightarrow NH_2SO_2NHNO_2 + H_2O$

Chlorination

$NH_2SO_2NH_2 + HOCl \longrightarrow NH_2SO_2NHCl + H_2O$

Salt Formation

$NH_2SO_2NH_2 + 2NaOH \longrightarrow NaNHSO_2NHNa + 2H_2O$

Various mono- and di-metallic salts have been made.

Heat

$NH_2SO_2NH_2 \longrightarrow NH_2(SO_2NH)_xSO_2NH_2 + (SO_2NH)_3 + NH_3$

Hydrolysis

$NH_2SO_2NH_2 + H_2O \longrightarrow NH_2SO_3NH_4 \xrightarrow{H_2O} (NH_4)_2SO_4$

Sulfamide is stable in dilute acid or alkaline solution.

PCl_5

$NH_2SO_2NH_2 + 2PCl_5 \longrightarrow SO_2(N{:}PCl_3)_2 + 4HCl$

Alcohols

$NH_2SO_2NH_2 + 2ROH \longrightarrow R_2O + NH_2SO_3NH_4$

Sulfamide is a strong dehydrating agent under some conditions.

Organic Acids

$NH_2SO_2NH_2 + RCOOH \xrightarrow{\text{Pyridine}} RCONH_2 + ?$

Amines

$NH_2SO_2NH_2 + RNH_2 \longrightarrow NH_2SO_2NHR \xrightarrow{RNH_2} RNHSO_2NHR + NH_3$

Primary and some secondary amines react thus.

Acylating Agents

$NH_2SO_2NH_2 + RCOCl \longrightarrow RCONHSO_2NH_2 \xrightarrow{RCOCl} RCONHSO_2NHCOR + HCl$

Acid anhydrides react similarly.

Aldehydes

$NH_2SO_2NH_2 + C_6H_5CHO \longrightarrow NH_2SO_2N{:}CHC_6H_5 + H_2O$

Other aldehydes may form methylols or resins, depending on conditions.

Isocyanates

$NH_2SO_2NH_2 + RNCO \xrightarrow{\text{Base}} NH_2SO_2NHCONHR$

For more information about B&A Sulfamide, and sample quantities, write us today!

BAKER & ADAMSON®
Fine Chemicals

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

Check 1597 opposite last page.

conventions and exhibits

Nov. 13-15. American Petroleum Institute, 41st Annual Meeting, Conrad Hilton Hotel, Chicago, Ill.

Nov. 15-17. Eastern Analytical Symposium, Statler Hilton Hotel, New York City.

Nov. 17-18. The Chemical and the Food and Allied Industries Division of the American Society for Quality Control jointly sponsoring course in EVOP Programming, Pick-Congress Hotel, Chicago, Ill.

Nov. 21. Manufacturing Chemists' Association, Semi-annual Meeting, New York City.

Nov. 24-25. American Physical Society, Chicago, Ill.

Nov. 27-*Dec.* 1. Southeast Region, National Association of Corrosion Engineers, Key Biscayne Hotel, Miami, Fla.

Nov. 27-*Dec.* 1. 28th Exposition of Chemical Industries, Coliseum, New York City.

Dec. 3-6. 54th Annual Meeting, American Institute of Chemical Engineers, Hotel Commodore, New York City.

Dec. 3-7. Eastern Joint Computer Conference, Sheraton-Park Hotel, Washington, D.C.

Dec. 4-6. 48th Annual Meeting, Chemical Specialties Manufacturers Association, Roosevelt Hotel, New York City.

Dec. 7. Annual Meeting and Dinner, Synthetic Organic Chemical Manufacturers Association, Hotel Roosevelt, New York City.

Dec. 7-9. ACS Southeast and Southwest Regional Meetings, New Orleans, La.

Dec. 11-13. Pharmaceutical Manufacturers Association

. . . Meetings and shows of interest to the chemical industries

Eastern Regional Meeting, Waldorf-Astoria Hotel, New York.

Jan. 22-25. National Plant Maintenance and Engineering Show, Convention Hall, Philadelphia, Pa.

Jan. 25-27. National Society of Professional Engineers, Winter Meeting, King Edward Hotel, Jackson, Miss.

Jan. 30-*Feb.* 2. Annual Technical Conference, Society of the Plastics Engineers, Penn-Sheraton Hotel, Pittsburgh, Pa.

Feb. 5-9. American Society for Testing Materials, Committee Week Meeting, Statler-Hilton Hotel, Dallas, Tex.

Feb. 6-8. Conference, Reinforced Plastics Division of Society of the Plastics Industry, Edgewater Beach Hotel, Chicago, Ill.

Feb. 12-15. 12th Exposition of the Air-Conditioning, Heating and Refrigeration Industry, Los Angeles, Calif.

Feb. 16-18. American Society for Metals, Conference, Fairmont Hotel, San Francisco, Calif.

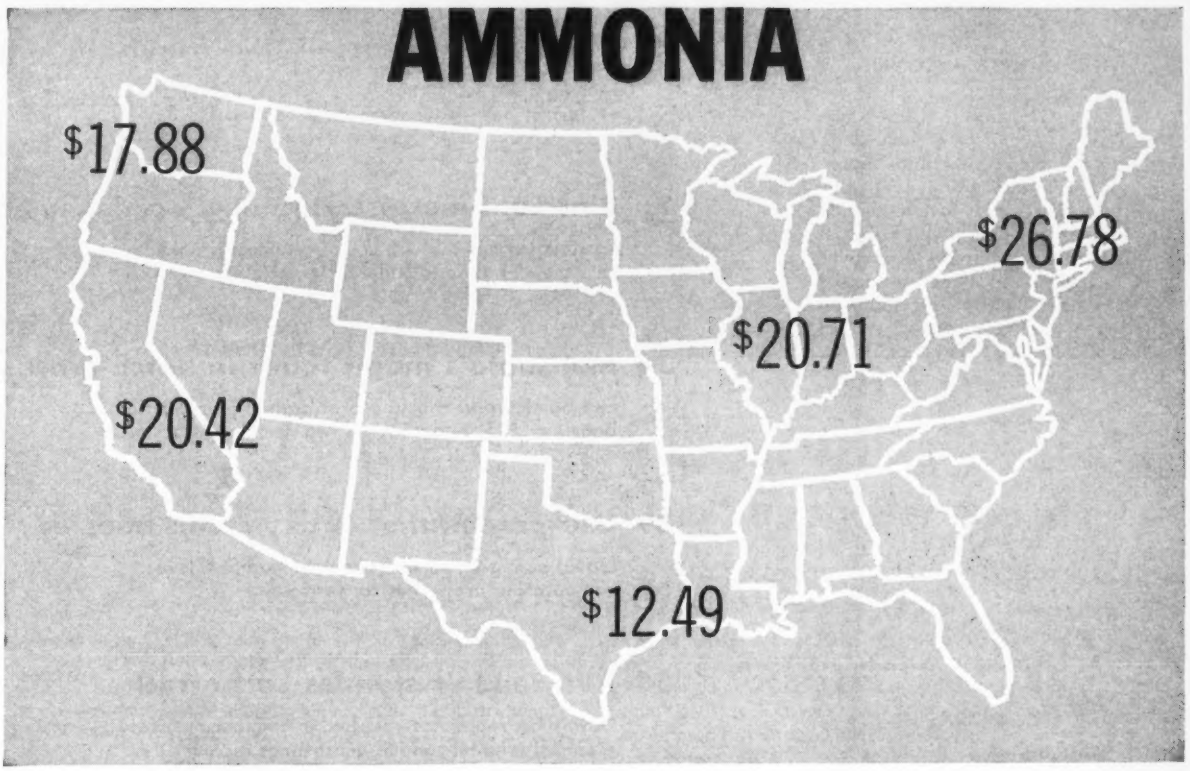
Feb. 18-22. American Institute of Mining, Metallurgical and Petroleum Engineers, Annual Meeting, New York City.

Mar. 13-14. 2nd Symposium on Packaging of Chemical Products, Manufacturing Chemists' Association, Inc., Chase-Park Plaza Hotels, St. Louis, Mo.

Mar. 19-23. National Association of Corrosion Engineers, Annual Conference and Show, Municipal Auditorium, Kansas City, Mo.

Mar. 20-29. American Chemical Society, National Meeting, Washington, D.C.

MORE PROFIT WITH AMMONIA



Kellogg Steam Methane Reforming Process Sets New Lows in Direct Operating Costs

Wherever you may be planning a new ammonia plant—for ammonia alone or as a component of a complete fertilizer complex, recent developments in Kellogg Steam Reforming now make a Kellogg-designed ammonia plant more economical than ever to operate as well as to build.

The figures shown above are direct operating costs per ton for five major U.S. areas. They are based on rates given in the utility table (right). Catalyst and chemical consumption have been included—at 34¢ per ton of ammonia product and 7¢ per ton, respectively. Labor, maintenance, taxes, insurance, depreciation and interest have not been included since these vary with individual client situations.

Feedstock for the process in this case is natural gas. Comparable low operating costs are possible with refinery gas feed, or even naphtha, under certain circumstances.

For a detailed description of Kellogg's ammonia process and other data, write for the new 12-page booklet—"Ammonia".

UTILITY UNIT COSTS*

	EAST COAST	GULF COAST	MID-WEST	PACIFIC NORTHWEST	WEST COAST
Natural Gas—Feedstock and Fuel, ¢/MM Btu	59	20	40	38	37
Electric Power, ¢/KWH	0.7	0.6	0.8	0.5	0.9
Cooling Water, ¢/M Gals.	2.4	1.8	2.5	2.2	2.2
Steam, ¢/M Lbs.	65	32	67	56	56

**Cost of steam is based on minimum fuel cost for each area*

THE M. W. KELLOGG COMPANY
711 Third Ave., New York 17. *A subsidiary of Pullman Incorporated*

Offices of other Kellogg companies are in Toronto, London, Paris, Rio de Janeiro, Caracas, Buenos Aires

"See our exhibit at the Chem Show"
Check 1598 opposite last page.

CHEMICAL PROCESSING

HIGHLIGHTS

NOVEMBER 1961

VOLUME 24 • NUMBER 11

THIS MONTH'S COVER

All that reacts in the CPI is not continuous — not by a long shot. Because of this sometimes overlooked situation, our cover this month features the article detailing Monsanto's use of an unusual programming technique to uncover hidden profits in batch processes (p. 34). Incidentally, the photo on the right depicts some typical batch reactors at Air Reduction Co.

INDEX

27 Chemical Business
39 Chemical Materials
195 Chemical Boobytraps
2 Conventions & Exhibits
58 Corrosion Control
204 Current Literature
51 Engineering Data
24 Letters from Readers
180 Material Handling & Packaging
8 Our Growing Industry
191 Plant Engineering, Safety and Fluids Handling
72 Processing Equipment
170 Process Instrumentation & Laboratory Apparatus
22 Recent Books
201 Safety Slants
16 Spotlight on People
20 Watching Washington
224 Advertisers' Index

Special This Month

27 Employee benefits — the fringe thickens

Many employees do not realize dollar value of these as part of pay—education job is needed

31 Platinum metals bring new economies to CPI

Possible savings through use of platinum-titanium chlorine electrode loom large; other uses on tap

34 Monsanto's magic touch in batch processing

End-point programming scores dramatic production boosts of 20% and 25% on two chemical processes

39 Use-potential of epoxy resins boosted

Liquid curing agent and viscosity modifier have eye-catching properties for formulators

58 PVC conduit stymies salt attack

Downtime, repair costs slashed in ammonium sulfate plant after metal conduit and fittings replaced

75 Chem Show exhibits hit hard at rising costs

Finding—from over 500 exhibits—the ones with answers for you is herculean prospect. CP's 84-page guide is designed for efficient hiking

Other Features

68 Detergent discoloration deterred with exchanger

72 Mill does work of seven, cuts space needs 90%

162 Optimum drying of paper assured at lowest cost

170 Solids mass flowmeters scoring success

180 Feeding clay at 1/3 cost via engineering ingenuity

186 Salicylic-acid handling headache-free with bins

191 Celanese gains flexibility with 700 steam turbines

196 Teflon sealing capsule simplifies ball valve

THAT'S INTERESTING

Thermionic generation

Heat from conventional fuel is converted directly into electricity by a flame-heated thermionic generator successfully tested by Atomics International.

The unit, resembling a metal radio tube, burns a mixture of propane and air.

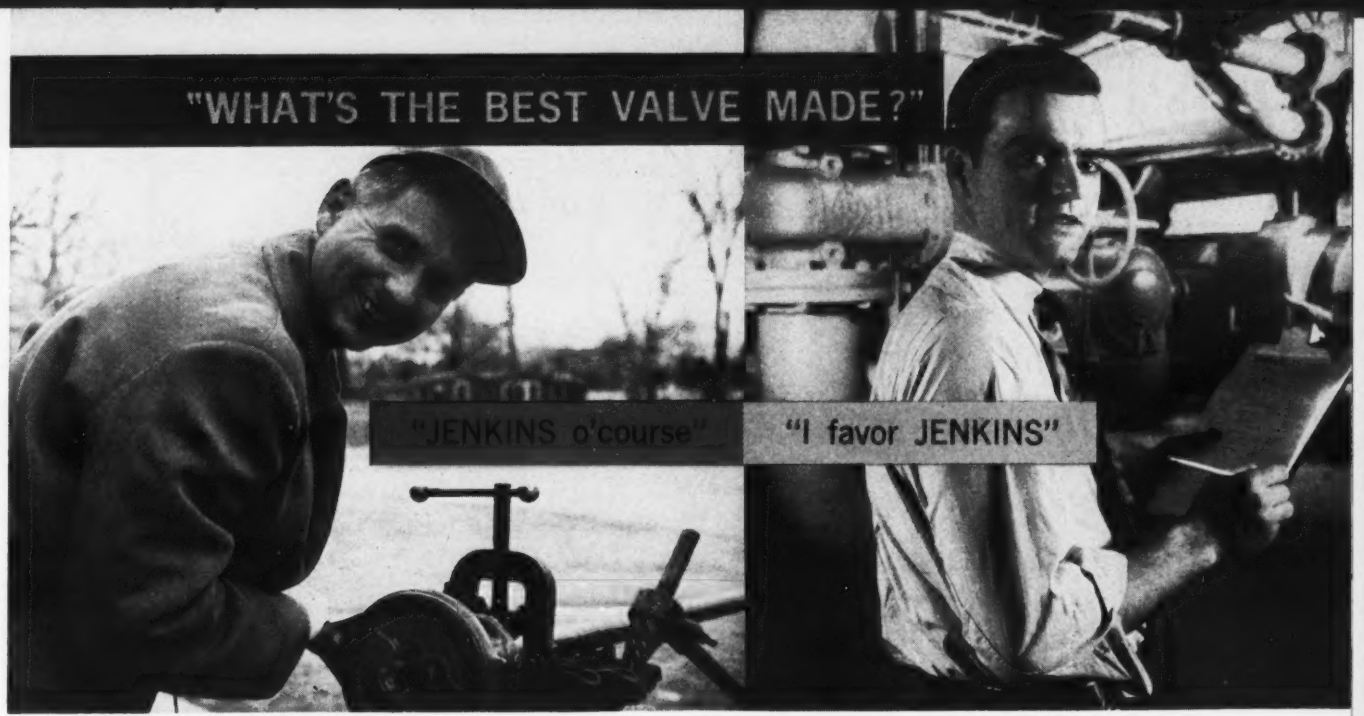
Principal parts are the furnace and converter. The latter consists of two electrodes. As the flame heats one electrode to 2800°F electrons boil off and jump a small gap to the cooler electrode, thus producing an electric current.

Alert asleep

The brain stays alert and able to direct complicated activities even during deep sleep, a recent study by the Army Institute of Research shows.

Five soldiers were used in experiment.

For more information on product at right, specify 1599. "See our exhibit at the Chem Show"

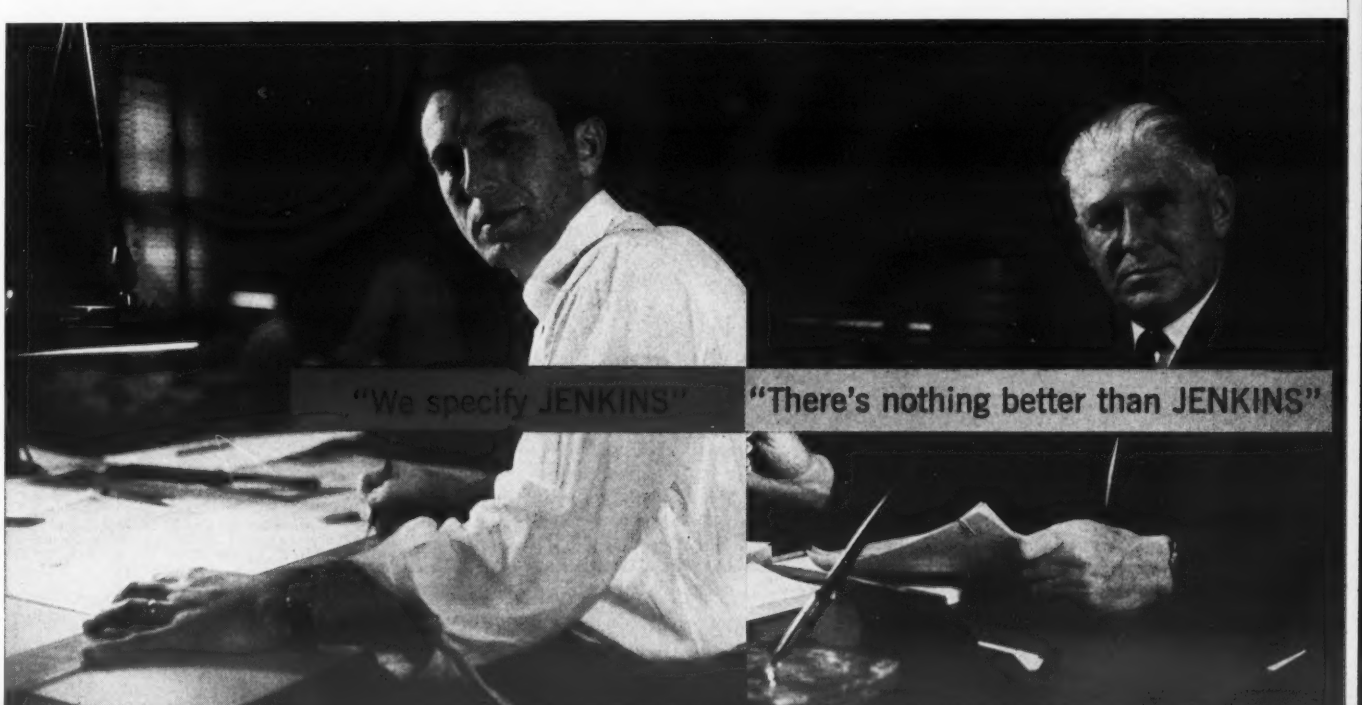


Trusted by Everyone

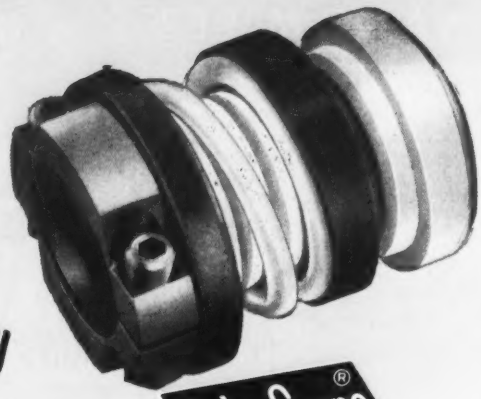
JENKINS VALVES and the Supply Service of

the local JENKINS DISTRIBUTOR

When you deal with the local Jenkins Distributor, you get the protection of a DOUBLE ASSURANCE of satisfaction: Valves of unexcelled quality and supply service of the highest caliber. Only the most competent distributors are selected by Jenkins Bros. to be the local sales and service facilities for Jenkins Valves. They have the stock, know-how and integrity to justify your full confidence. You'll find it good business to deal with your local Jenkins Distributor ...an important part of Jenkins Bros.



Here's A Shaft Seal For Extremely Corrosive Service



TYPE 20

Made of DuPont Teflon

This seal is built to handle the most corrosive services. It will stand up under all conditions of acids and salts, oxidizing agents and organic compounds.

It is so designed that all parts that normally contact the fluid are made of chemically-inert DuPont Teflon. Also, for this same reason it can be operated over wide temperature range up to 250° F.

Mechanically, its bellows type construction readily adapts it for use in all non-abrasive slurry applications. It also compensates for extreme shaft run out.

Available in single face construction for internal or external mounting, double face for internal mounting.

Full range of shaft sizes from ⅝" to 3".

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CHEMICAL PROCESSING.

NOVEMBER 1961
VOLUME 24 • NUMBER 11

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Paints, varnishes, lacquers
Other chemicals and chemical products
Paper and allied products
Petroleum and coal products
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Stone, clay and glass products
Atomic energy establishments

Other Industries Utilizing Chemicals and Chemical Processes

Food and allied products
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Metallurgical products
Finished metal products, machinery
All other manufacturing

and
Services to Chemical Processing Field, Government and Public Utilities, Educational

Special chemical industry equipment
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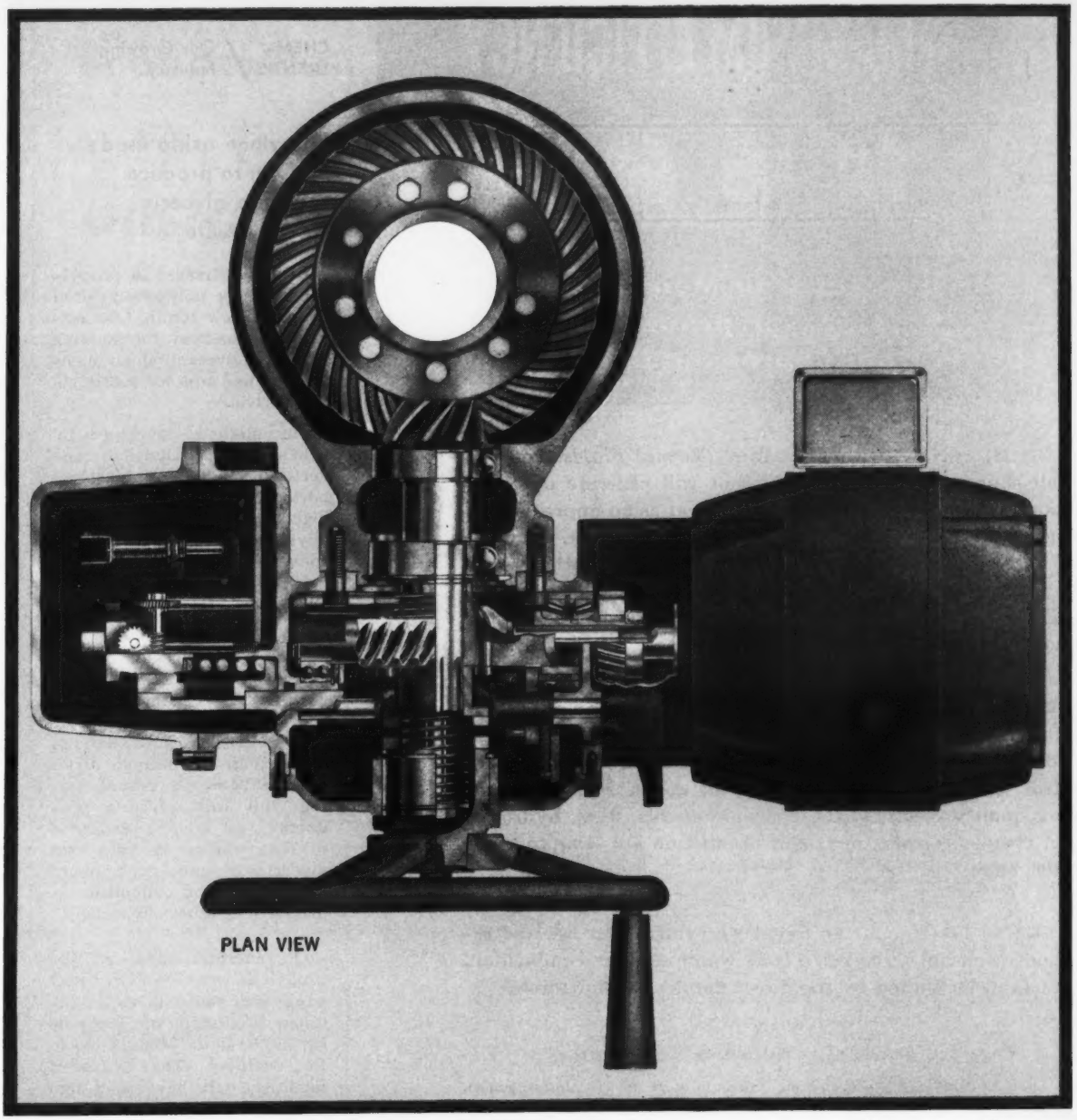

Now–"Crane Teledyne" motor operator for valves

It's new and only from Crane!

Today Crane is the only full line valve manufacturer that offers its own motor operator; this simplifies and speeds up your ordering and installation. And you get undivided responsibility for performance from one manufacturer.

"Crane Teledyne" was designed to provide torque only (thrust is taken on valve parts). This feature results in lower cost, smaller size and less weight than other operators with comparable output ratings.

We specifically designed "Crane Teledyne" for a wide variety of Crane valves. You can order it in two ways: as a conversion kit to motorize present valves in minutes; or fully motorized Crane valves straight from stock.

The motor operator is equipped to act as a gear-operated valve (4:1 ratio) in case of electrical emergencies. Available with push-button control or can be programmed for automated operation.

For full information, call your Crane distributor. Or write Crane Co., Industrial Products Group, Dept E, 4100 So. Kedzie Ave., Chicago 32, Ill. In Canada: Crane Ltd., 1170 Beaver Hall Square, Montreal, Que.

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AT THE HEART OF HOME AND INDUSTRY

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WATER TREATMENT
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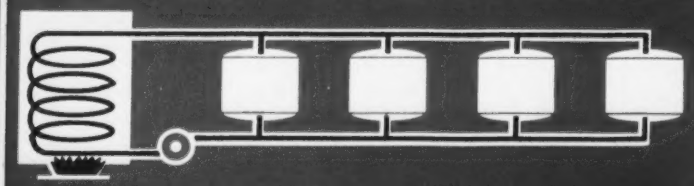
FOR + MAXIMUM EFFICIENCY



Systems operating on Monsanto *Thermal Fluids* deliver process heat up to 600° F. from unpressurized *liquid*

SAVE BIG! Now, with Monsanto *Thermal Fluids*, you can install a process heating system that will generate up to 20 million BTU per hour and deliver the heat as an unpressurized liquid to multiple use points! Needs no vapor traps, gas blankets, pressure piping, vaporizers, condensers, or other fancy "gadgets." Needs no costly, space-filling safety devices. No water conditioning; no pressure danger; no fire danger—*you do not need a licensed engineer to operate a Thermal Fluid system!*

SPEED OUTPUT! With heat delivered via a liquid *Thermal Fluid*, you cut maintenance to the bone (no corrosion, no fouling of tubes, pipes, pumps, or coils); heat evenly (*no hot spots*); control temperature on-the-button (*to within 2° F.*). Result: better quality resins, foods, pharmaceuticals, dyes, hydrocarbons, chemicals—*plus* increased production (*in some cases up to 50% more*)!

SAFETY, TOO! You can forget worrying about fire and explosion! Monsanto *Thermal Fluids* won't support combustion. Can't even be ignited by the direct flame of a blowtorch!

This recent report tells the safety story:

"My operator fired the gas heater but failed to start the circulation pump. The coil overheated and ruptured. The Monsanto fluid poured into the firebox. There was a lot of smoke, of course, but no external fire. And as soon as the heater was cut off, the smoking stopped immediately!"

Mail This Handy Coupon Today for Design Engineering Data

MONSANTO CHEMICAL COMPANY
Organic Chemicals Division
Dept. 4468-GG, St. Louis 66, Mo.

Monsanto

Please send me: ( ) Technical Bulletin 1248 on Monsanto *Thermal Fluids;* and ( ) list of heating system designers and heater manufacturers.

NAME.....

COMPANY.....

STREET.....

CITY..... *ZONE*..... *STATE*.....

Check 1602 opposite last page.

Propylene oxide used by Olin to produce synthetic glycerin via new route

As CPI INTEREST in propylene and its polymer pressed toward a new zenith, *Olin* unveiled a method for making synthetic glycerin which opens another use area for a propylene derivative.

The method, developed by Olin's Organics Division, converts propylene oxide, reportedly through a new and highly efficient catalyst, to allyl alcohol, which is then converted to glycerin.

Olin will use this method in a multi-million-dollar plant, now under construction at the division's Doe Run organic chemicals complex in Brandenburg, Ky. Expected to be in operation by April 1962, the plant will have a capacity of more than 40 million lb/yr. For the 12-month period ending with July, glycerin production, all grades, amounted to 272.5 million lb. Olin uses glycerin in explosives, pharmaceuticals and cellophane — products of other divisions.

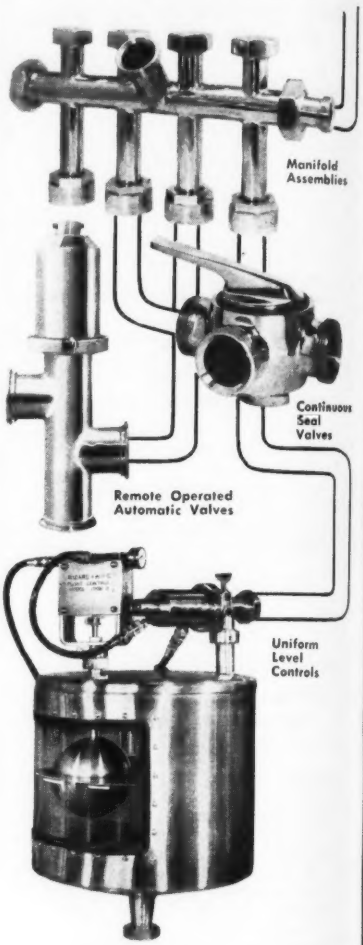
On another sector of the propylene front, *Sun Oil Company* announced plans to increase production of propylene by 150% at its Marcus Hook, Pa., refinery. The expanded facilities will have a design capacity of 180 million lb/yr of high-purity propylene and will increase Sun's total production capability to 300 million lb/yr. This, says Sun, will make it the largest commercial producer of propylene in this country. Construction costing $2.2 million began this month. It will be operative early next year.

Earlier *AviSun Corporation* staked a claim to having the world's largest polypropylene plant with the dedication of its 100-million-lb/yr facility at New Castle, Del. This capacity compares with a total output by all producers last year of not quite 41 million lb.

To page 10

A-P-C

FLOW CONTROL components



From America's most completely integrated stainless steel component manufacturer. Prompt reply to your questions. Estimates and famous A-P-C engineering consultation are yours for the asking.

A-P-C

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1075 Perkins Avenue
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INTERESTING THAT'S

Electrostatic printing

Fragile, soft, or irregular materials can be printed by means of a printing innovation developed by Stanford Research Institute's graphic sciences laboratory.

Called "pressureless" or electrostatic printing, it utilizes a 200-mesh steel screen which is charged to about 1500 v and a metal plate bearing an opposite charge. A stencil in which the image area is transparent and the non-image area opaque, is placed on the screen. The paper is placed between the screen and rear electrode.

When a dry-ink mixture is brushed on the screen, it becomes charged and is attracted through the stencil and onto the paper by the electrode.

For more information on product at right, specify 1604 see information request blank opposite last page.

economical

GAS PURIFICATION

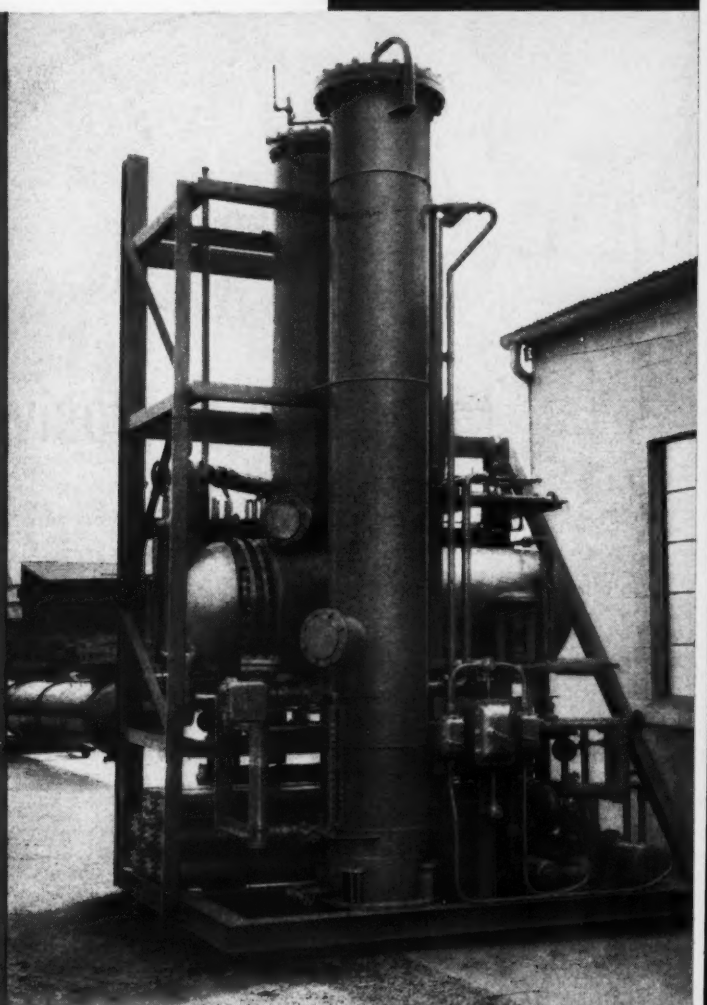
with Girdler's

new

package

GIRBOTOL

plant!



This compact, package Girbotol gas purification plant is designed, engineered and constructed with the same skill and high quality as Girdler's famous site-erected plants, first put in operation in 1929. The compact plant is completely fabricated at our Louisville Plant and can be delivered by rail or truck trailer with only a minimum of work before start-up.

The Girbotol process has been widely received by industry as the best process for:

natural gas purification
refinery gas purification
synthesis gas purification
carbon dioxide recovery
hydrogen sulfide recovery
liquid hydrocarbon desulfurization
hydrogen purification
inert gas preparation

Write for full information on the new Girdler compact package gas purification plant.
A free brochure is available on request.

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designers and constructors of plants for the production of: Hydrogen ▪ Carbon Monoxide Carbon Dioxide ▪ Hydrogen Sulfide ▪ Formaldehyde ▪ Synthesis Gases ▪ Hydrogen Cyanide Anhydrous Hydrogen Chloride ▪ Ammonia ▪ Girbotol Gas Purification ▪ Sulfur Recovery ▪ Urea

SUBSIDIARY OF THE CHEMICAL & INDUSTRIAL CORP.

...to handle Corrosives!

The handling of corrosive fumes is no job for an amateur. It takes a dash of caution, a double-dash of know-how, and correctly designed equipment of the right materials.

Buffalo Forge is no amateur. In 84 years of industrial fan manufacture, we've learned to handle the "hot" ones. Today, there's a 'Buffalo' fan for every corrosive condition: fiber glass, cast iron, and cast lead fans, and a wide range of stainless, bronze, and other special alloy fans. Rubber lined and special coated ones are available, too.

No matter which you choose, each has the design ruggedness and construction quality to withstand the corrosive punishment on its intended job.

In the event our standard models do not meet your specs, we'll be glad to build a "special". The resident Buffalo Forge representative in your area has all the facts. Call him today, or write our home office direct.

"Buffalo"

AIR HANDLING DIVISION
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Buffalo, New York
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Buffalo air handling equipment to move, heat, cool, dehumidify and clean air and other gases.

Buffalo Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

Buffalo Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

Check 1605 opposite last page.

OUR GROWING INDUSTRY

From page 8

AviSun is jointly owned by *American Viscose* and Sun Oil.

At about the same time that AviSun was dedicating its plant, *Hercules Powder Company,* which bills itself as the "first and largest commercial producer of polypropylene in the United States," announced completion of a multi-million-lb/yr polypropylene-fiber plant in Covington, Virginia. Initial capacity of the plant will be 12 million lb/yr, but this is readily expandable. Hercules has also established a complete fiber research center at Covington.

Meanwhile, Union Carbide Corporation's *Union Carbide Development Company* announced that the latter's polymer products department would produce slot-cast and bioriented polypropylene film. The film, to be produced in the corporation's facilities at Wayne, N.J., will be in production by mid-1962.

Other CPI companies are getting into the polypropylene act via marketing agreements with polypropylene producers. Among these are *Allied Chemical's* Plastics Division, *Du Pont, Spencer Chemical Company, W. R. Grace & Company, Rexall Drug & Chemical Company,* and *Union Carbide Plastics Company.* By the end of 1962, polypropylene production capacity is expected to exceed 475 million lb/yr.

The *Fluor Corporation, Ltd.,* will build a 2300-bbl/stream day pyrolysis gasoline-hydrogenation unit and a 12,500-bbl/stream day benzene recovery unit for *Mobile Chemical Company* at Beaumont, Texas.

North American Coal Corporation which is getting ready to start up its $2-million alum-producing plant at Powhatan Point, Ohio, has named the *Borden Chemical Company* as exclusive field agent to the U. S. paper industry.

To page 14

Sticky bulk materials no problem with JOY Limberollers®

Every time a Joy Limberoller belt conveyor idler turns, it flexes and cleans itself. Even the stickiest of materials like triple super phosphate never have a chance to build up and harden.

This unique flexing cleaning action is a result of the Limberoller's design. Essentially, it is a neoprene covered flexible steel wire cable. Neoprene discs are molded to the cable. The ends of the cable are swedged into bearings held in a swiveling mount. Suspended between the two bearings, the Limberoller assumes a natural catenary. This curve causes the flexing with each rotation of the idler, keeping it free of any material buildup.

If you are handling materials that are sticky, abrasive or corrosive the Limberoller can solve your problems. They can be easily mounted on your present conveyor. For more information, write for bulletin 2758-80.

JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

"See our exhibit at the Chem Show"
Check 1606 opposite last page.

THAT'S INTERESTING

Very, very elementary

A particle which has a lifetime of 4×10^{-23} sec has been discovered at the University of California's Lawrence Radiation Laboratory in Berkeley.

Named the omega meson, existence of the particle was predicted 2 yr ago by Stanford U. scientists. It plays an important role in the structure of protons and neutrons, the basic building blocks of atomic nucleii.

Ultrasonic pen

An ultrasonic ball point "pen" is being introduced by Ultrasonic Industries of Plainview, L. I., for use on strip and chart recorders.

It is capable of writing at a linear speed of 9000 fpm and requires no writing fluids or marking compounds. Writing lasts as long as the paper.

For more information on product at right, specify 1607 see information request blank opposite last page.

FALK

A GOOD NAME IN INDUSTRY

FALK STEELFLEX COUPLINGS
for industrial applications...large or small

Giant Falk Coupling smooths out steel blooming mill performance

On a blooming mill at the Copperweld Steel Company plant in Warren, Ohio, installation of a large Falk Steelflex coupling between motor and pinion stand eliminated troublesome noise and vibration which threatened to damage mill machinery. Transmitting 5,000 hp at 50/100 rpm, this is not the largest Falk coupling... others are designed to transmit up to 130,000 hp at 100 rpm.

This installation and others like it prove the Falk concept of shaft coupling design—namely, a modern shaft coupling must contribute to the successful performance of the machinery system.

What does this mean to you? Just this: On large machines as well as small, the exclusive Falk grid-groove design does make a difference, and the difference is torsional resiliency with the strength of steel...reason enough to specify Falk Steelflex couplings as "long life" insurance for your connected machinery.

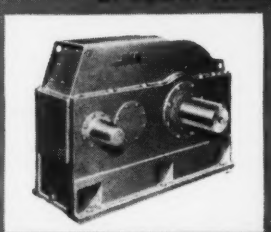
Falk Steelflex couplings are available in standard designs in 34 sizes for applications from .3 hp at 100 rpm to 130,000 hp at 100 rpm, with excellent delivery. Write for Bulletin 4100.

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN
MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS
Representatives and Distributors in most principal cities

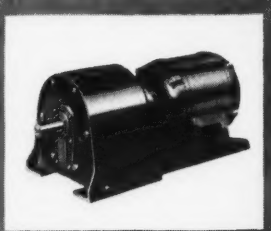
• • •

A Point to Ponder...When you need gear drives or shaft couplings of "FALK OR EQUAL" quality, where but from Falk can you get the "OR EQUAL"?

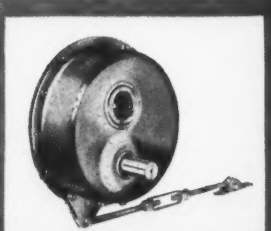
Other members of America's First Family of Power Transmission Products



SPEED REDUCERS
Parallel Shaft up to 3500 hp. Ask for Bulletin 1100. Also Right Angle and Concentric Shaft designs.



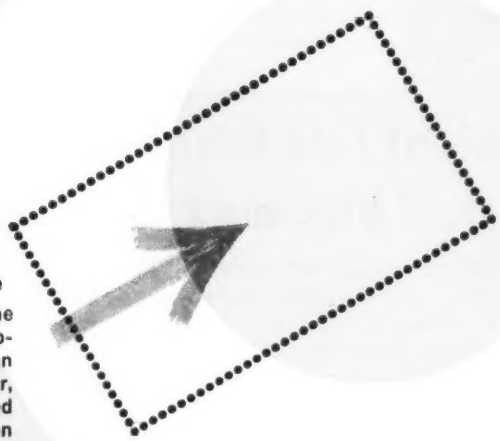
ALL-STEEL MOTOREDUCERS
—up to 75 hp. Horizontal, Vertical, and Right Angle. All-Motor and Integral Types. Ask for Bulletin 3100.



SHAFT MOUNTED DRIVES
—up to 125 hp. Ask for Bulletin 7100. Also Flange Mounted and Screw Conveyor Drives.

FALK, STEELFLEX and ALL-MOTOR are registered trademarks

...a new pattern of control for CONTROLLED DISPERSION

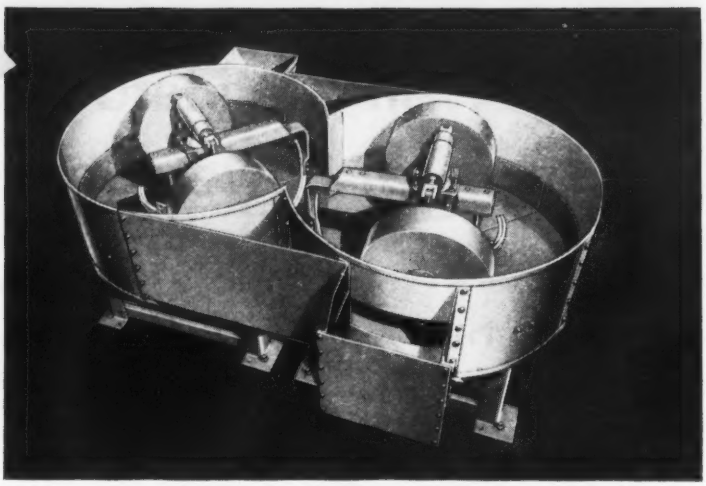


Continuous mulling starts here

The unique figure 8 pattern holds the key. In each pan, materials are subjected to the same mulling action employed in a batch muller. However, it is the continuous and prolonged *recirculation* of material between the pans which assures a thorough, controlled and continuous blending action . . . equal to that achieved in a batch muller. With *many* materials, quality is superior!

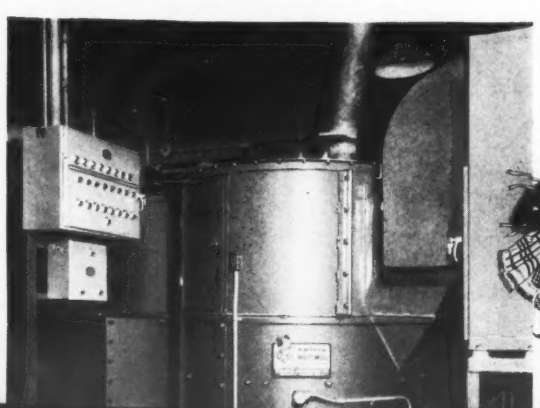
SIMPSON MULTI-MULL®

. . . the continuous muller



How and why it offers new opportunities for better, faster mixing of dry and wetted/solid materials

The achievement of intimate and controlled mulling at a high and continuous rate of production comes as a result of almost 20 years of development. Several continuous muller prototypes were abandoned before the Simpson Multi-Mull—a modification of the basic mulling concept which has been applied to Simpson equipment for over 50 years—demonstrated its mixing efficiency through plant usage. Now operational, the last unit shipped will bring total Multi-Mull tonnage to 14 million this year. Multi-Mull users are reporting benefits which are of significance to *anyone* who now uses a muller . . . and to many for whom batch mulling practice was not practical before:



ECONOMY—a welcome end to expensive, troublesome and space consuming batch preparation equipment.

CONTROL—over moisture and other additives, not possible in many batch mixing methods, which permit new quality control standards.

SPEED—the ability to reduce preparation time in direct ratio to the number of charge and discharge cycles needed previously.

PRODUCTION—continuous mulling boosts production with a *decrease*, rather than an increase, in equipment and floor space requirements.

QUALITY—the quality of continuously prepared material is equal in every way to that prepared by batch methods. Many users report *superior* prepared qualities and decided savings in raw materials.

APPLICATION—no cure-all, the Multi-Mull was introduced to do *certain* jobs better, faster and at lower cost than previous methods—and to widen the scope of application for the mulling principle of mixing.

It will pay you to have a *Mix-Muller man* tell you more about Multi-Mull—because the era of continuous mulling is here, *now*. Write for details—there is no obligation, of course.

See Multi-Mull in action
28th Exposition of Chemical Industries

SIMPSON *MIX-MULLER* DIVISION
NATIONAL ENGINEERING COMPANY
640 Machinery Hall Building
Chicago 6, Illinois

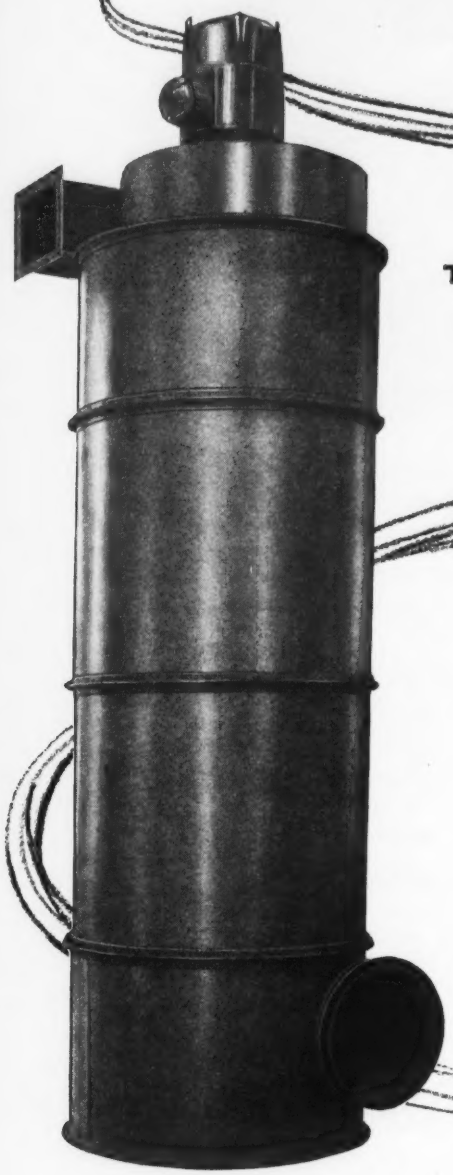
P461-S

For more information on product at left, specify 1608 see information request blank opposite last page.

COMPLETE "PACKAGED" FUME SCRUBBER

...in Standard Sizes ...at Lower Cost

THE Cyclonaire



If your "white room" or plant is faced with annoying fume removal problems, the Cyclonaire may offer a most inexpensive answer.

This compact wet bed scrubber does a fume removal job that once was possible only with expensive custom units. Removal of many gases (of 1% concentration or less) is 99% effective.

The Cyclonaire is made in four standard sizes with rated capacities of 750, 1650, 3500 and 6000 cfm. Construction can be either 12 ga. steel, lined with Tygon sheet plastic; or fiberglass reinforced polyester. The lined-steel unit comes complete with top mounted blower equipped with a rigid polyvinyl chloride (PVC) rotor. The lighter weight fiberglass reinforced polyester unit utilizes a separately mounted blower duct-connected to the scrubber.

Both units are shipped complete with the necessary packing, either ceramic Intalox saddles, metal or polypropylene Pall Rings, depending on weight factors or corrosive conditions.

40-H-3

VISIT BOOTH 111
EXPOSITION OF THE CHEMICAL INDUSTRIES
NOV. 27-DEC. 1, NEW YORK COLISEUM

The Cyclonaire is fully described in Bulletin FW-10R, free on request. Write for it today.

PROCESS EQUIPMENT DIVISION

U. S. STONEWARE
AKRON 9, OHIO

Check 1609 opposite last page.

OUR GROWING INDUSTRY

From page 10

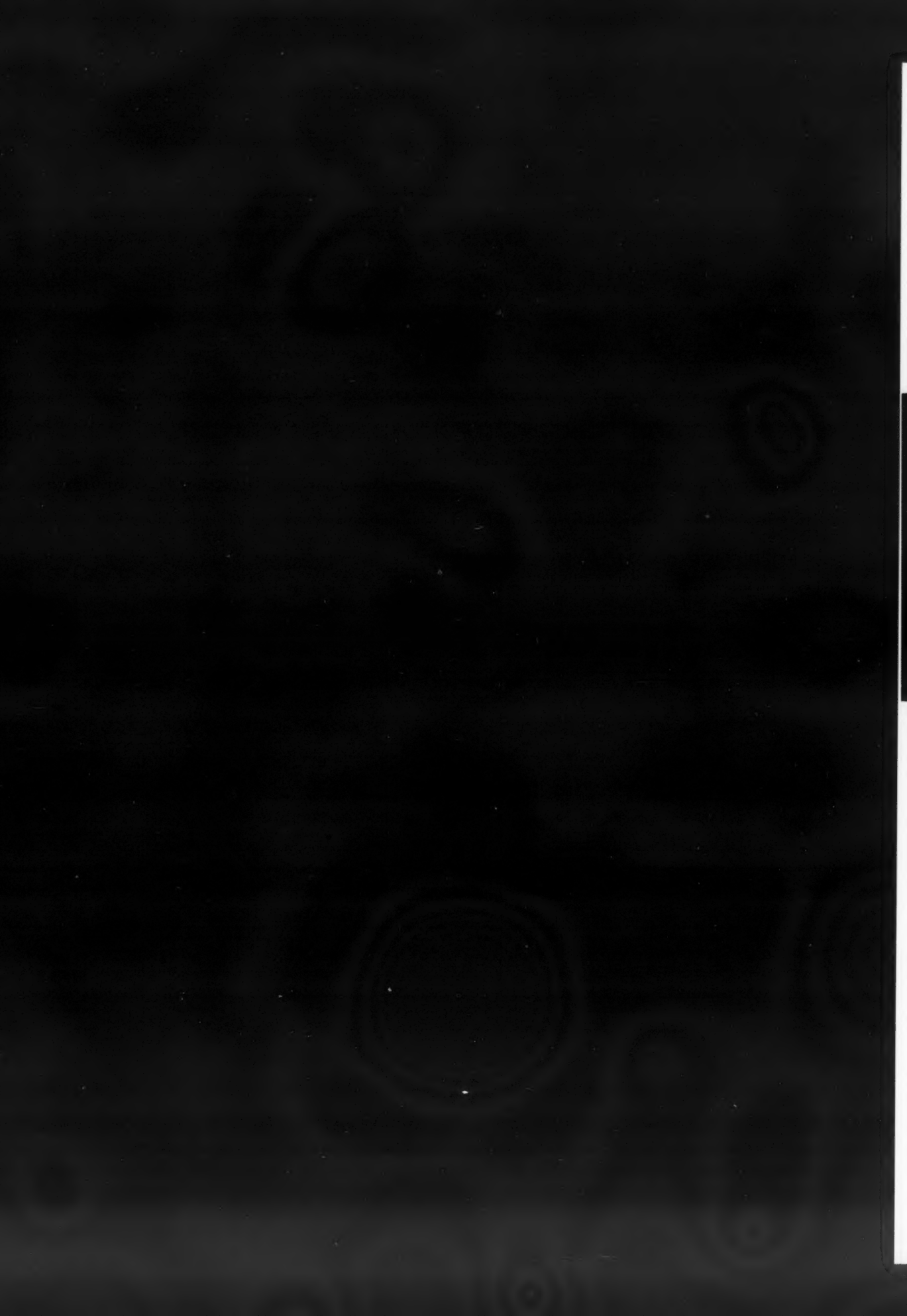
An additive, developed by *Universal Oil Products Company* to protect rubber from ozone-caused deterioration, will be produced at a million-lb/yr plant which UOP will build in McCook, Ill.

FUND-RAISERS worthy of note are *Shell Oil Company* and *International Minerals & Chemicals*. IMC borrowed $40 million from Prudential Insurance, to be repaid over a 20-year term. Funds will go for capital projects. Shell raised $200 million by sale of debentures to be repaid over a 25-year period. Since its last long-term public borrowing venture in 1946, Shell's net assets have ballooned 360%. Its chemical business is 10 times greater than it was 15 years ago.

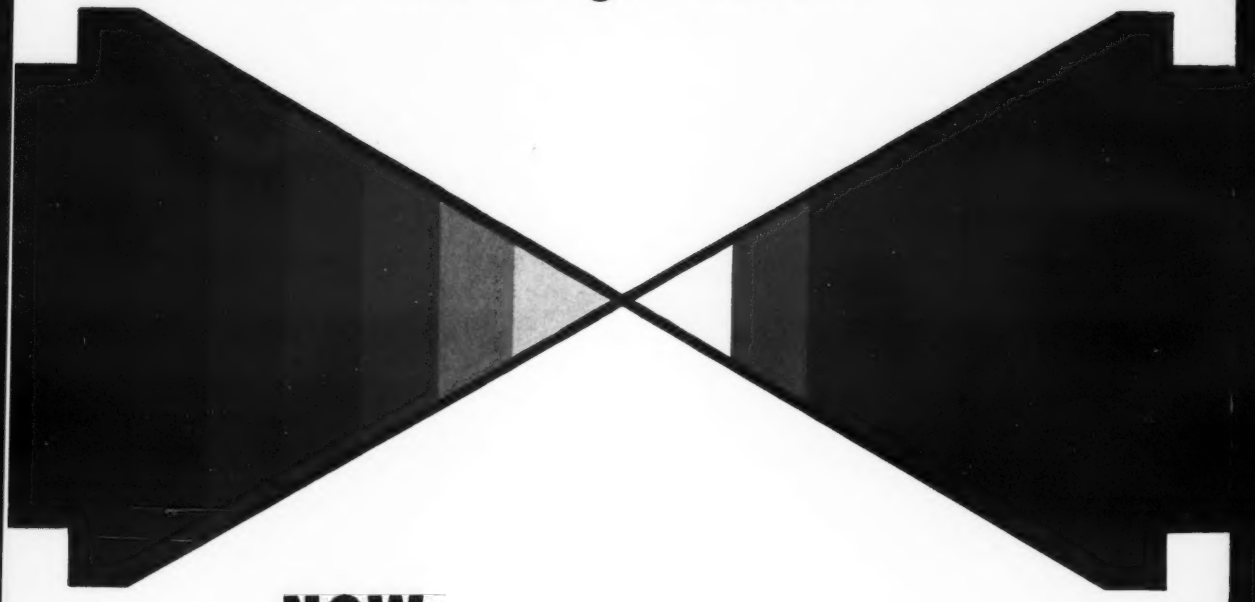
Texas Eastman Company, an Eastman Kodak division, has begun construction of a 275-mile pipeline which will link the division's plant near Longview, Texas, to *Phillips Petroleum Company's* salt dome storage facilities near Sweeny, Texas. The pipeline will carry propane to Longview.

Kaysam Corporation of America has formed a subsidiary, *Fortune Chemical Corporation*, to manufacture plastisol, organisol, neoprene latex, natural latex, acrylonitrile and polyisobutylene compounds.

RECENT ACQUISITIONS by CPI companies include: Western *Organic* of Sante Fe Springs, Calif., by *Neville Chemical Company* of Pittsburgh—Neville will operate it as a subsidiary; *Fiber Chemical Corporation*, Cliffwood, N.J., by *Diamond Alkali Company*—still another Diamond subsidiary; a majority interest in *J. P. Frank Chemical and Plastic Corp.* by *The Atlantic Refining Company*—another step toward diversification in chemicals; *Delta Oxygen Company, Inc.*, of Memphis, by *Air Products and Chemicals, Inc.* of Allentown, Pa.; and *Highland Stucco and Lime Products, Inc.*, Van Nuys, Calif., by *Dyna-Therm Chemical Corporation*, Culver City, Calif. ■

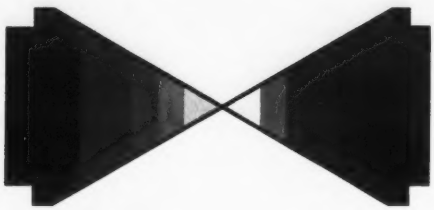


Some valves are designed
for the easy services...
the others,
for the tough ones...

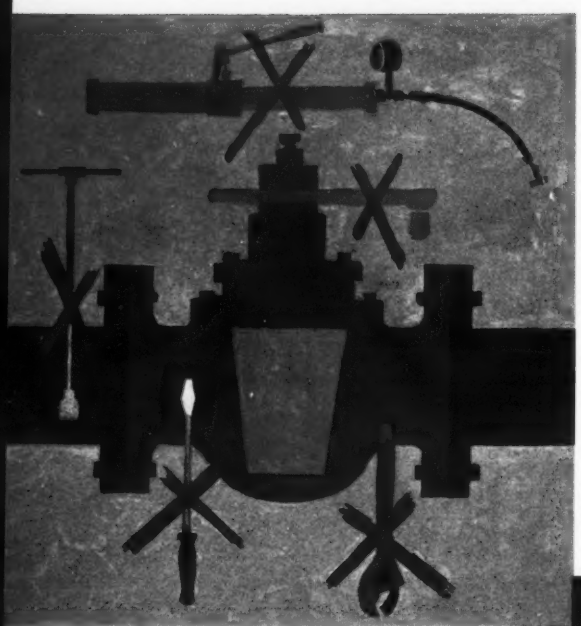


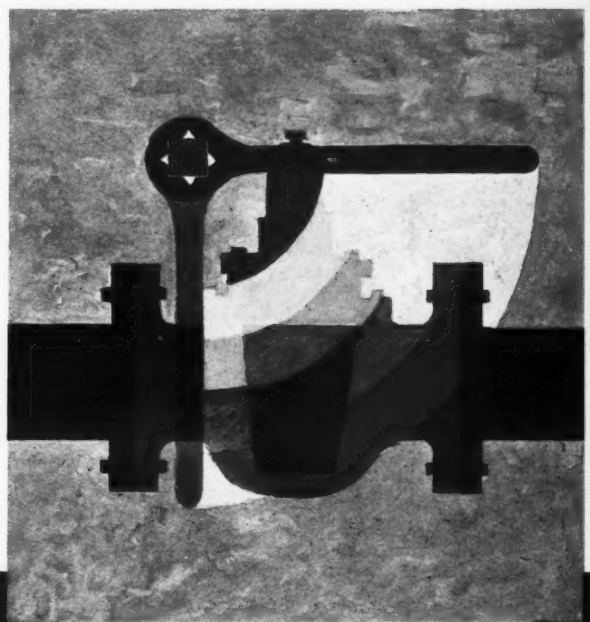
NOW,
ROCKWELL HAS DEVELOPED
AN EXCITING, NEW
CONCEPT THAT
SPANS THE SPECTRUM
OF VALVE SERVICES

THE NEW ROCKWELL PE



Now, in one
for versatile





Attention-Free Performance

Some valve users put a premium on a valve that can be installed and forgotten —that needs no attention. For many non-critical services, this kind of valve is adequate: the new Rockwell PERMATURN valves can be used in such services with no attention—and with excellent results.

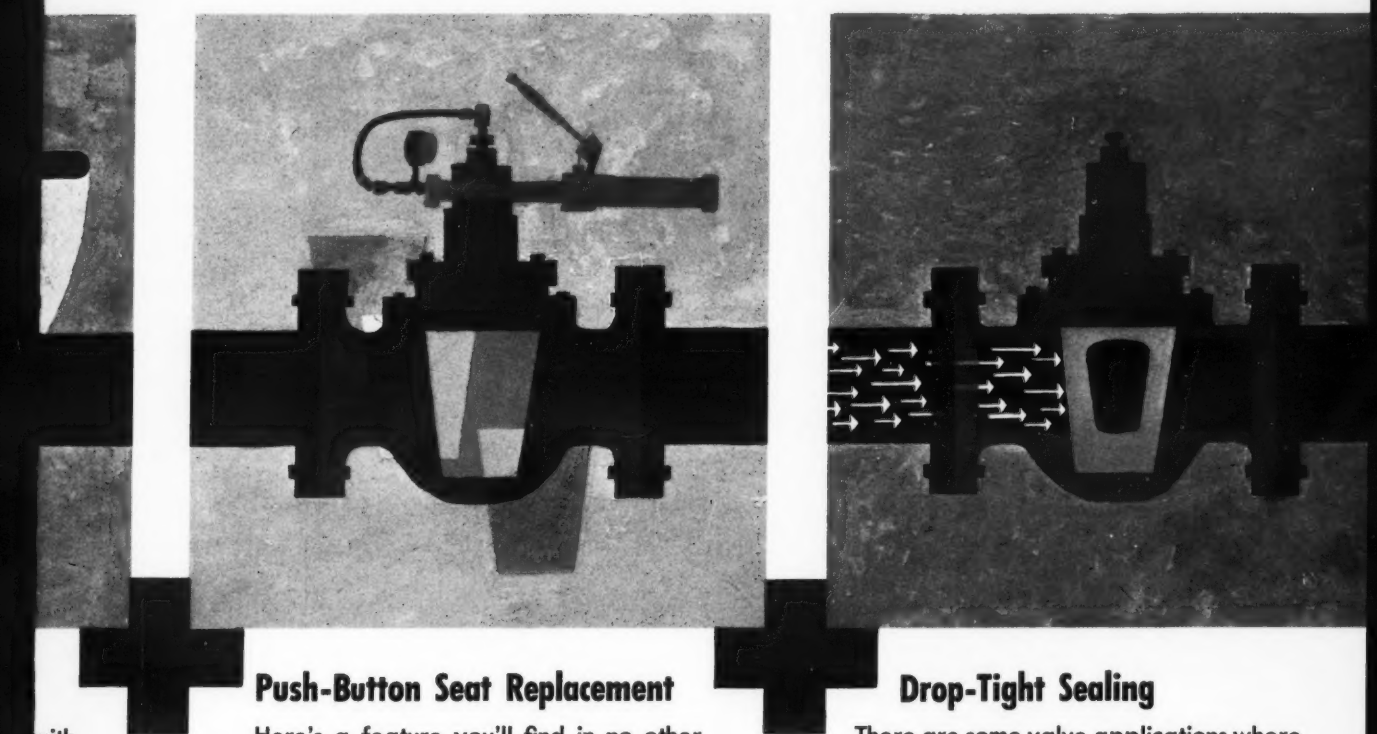
Easy 90°-Turn Operation

Fast opening and closing are easier with the new Rockwell PERMATURN than with any other valve ever developed. Just a quick, smooth quarter-turn from full-open to shut-off, and this unique valve design assures low-torque operation always—that's where the name PERMATURN comes from!

LIFT THESE PAGES for more information on this exciting new valve

PERMATURN® VALVE DESIGN!

ne valve, you get all the features needed
tile application to any fluid control service



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Push-Button Seat Replacement

Here's a feature you'll find in no other type valve: you can put a new seating surface in the new PERMATURN valve in seconds, *without loosening a single bolt.* You can replace valve seats as often as you like—no more putting up with leaky valves. You add years of life—and save money—with this performance-extending feature of PERMATURN valves.

Drop-Tight Sealing

There are some valve applications where there's just no substitute for the bottle-tight, wear-defying characteristics of the new Rockwell PERMATURN valve used with a *regular program of sealant replacement.* And in these critical services, the PERMATURN valve has dramatically reduced operating torque requirements.

valve line!

THE NEW ROCKWELL

available in all siz

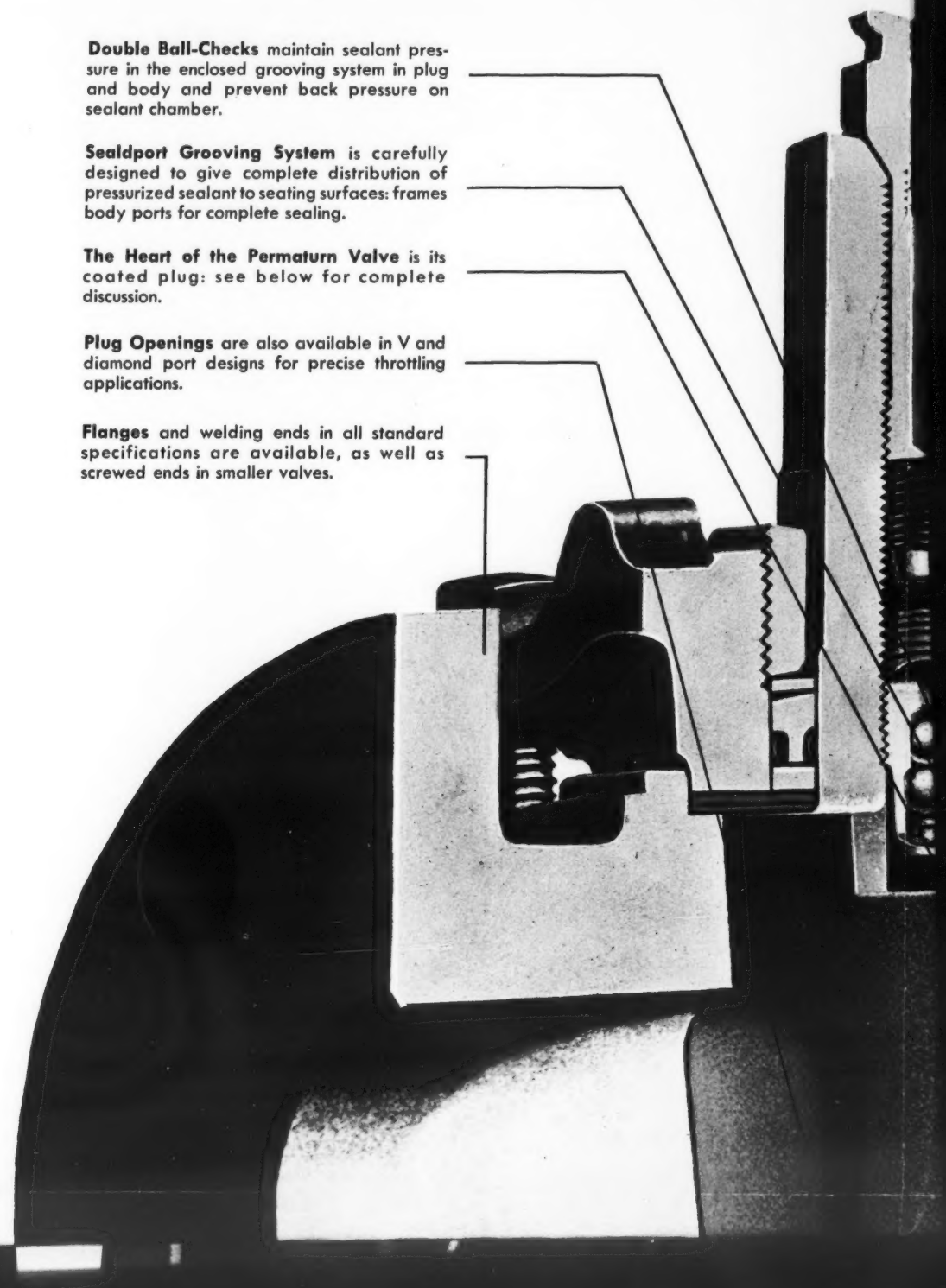
Double Ball-Checks maintain sealant pressure in the enclosed grooving system in plug and body and prevent back pressure on sealant chamber.

Sealdport Grooving System is carefully designed to give complete distribution of pressurized sealant to seating surfaces: frames body ports for complete sealing.

The Heart of the Permaturn Valve is its coated plug: see below for complete discussion.

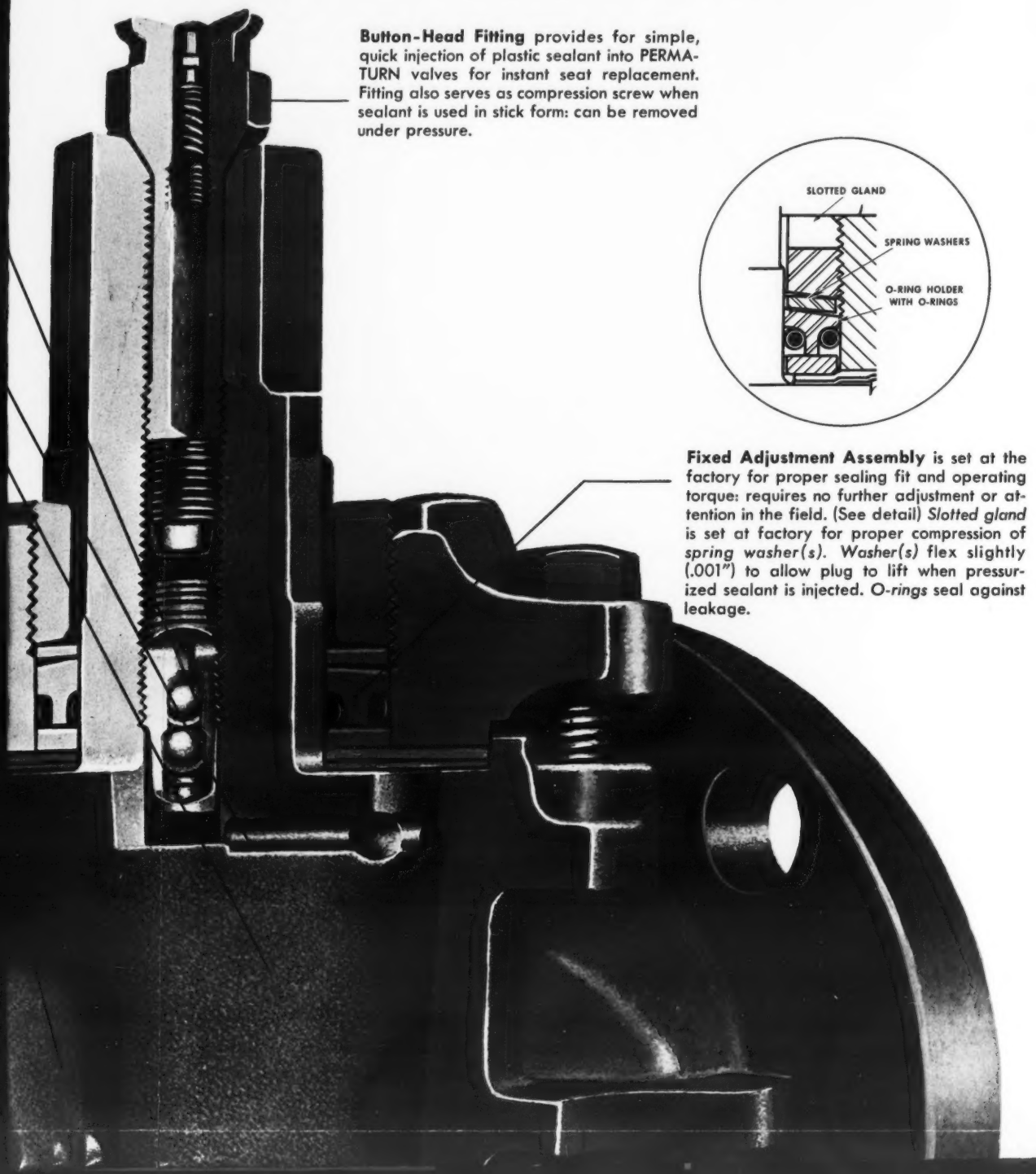
Plug Openings are also available in V and diamond port designs for precise throttling applications.

Flanges and welding ends in all standard specifications are available, as well as screwed ends in smaller valves.



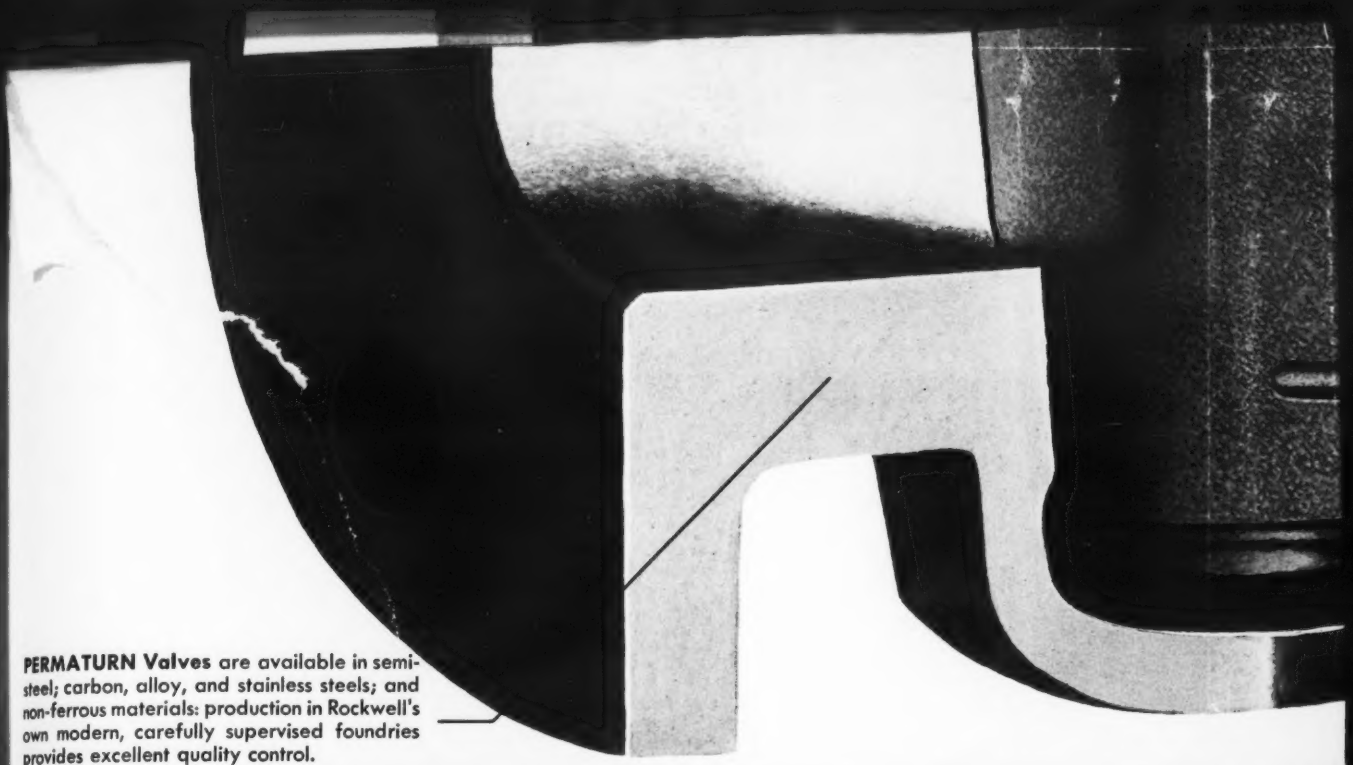
VELL PERMATURN® VALVES

l sizes for all pressures

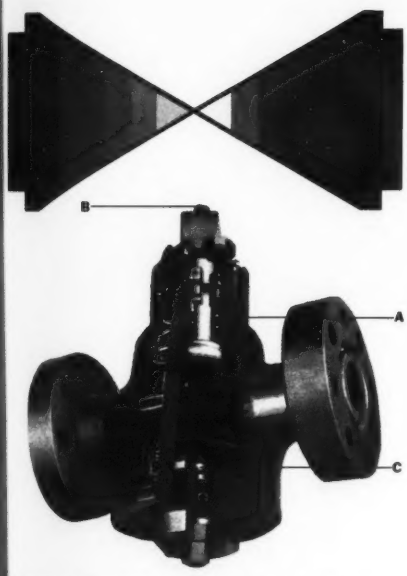


Button-Head Fitting provides for simple, quick injection of plastic sealant into PERMA-TURN valves for instant seat replacement. Fitting also serves as compression screw when sealant is used in stick form: can be removed under pressure.

Fixed Adjustment Assembly is set at the factory for proper sealing fit and operating torque: requires no further adjustment or attention in the field. (See detail) *Slotted gland* is set at factory for proper compression of *spring washer(s)*. *Washer(s)* flex slightly (.001") to allow plug to lift when pressurized sealant is injected. *O-rings* seal against leakage.



PERMATURN Valves are available in semi-steel; carbon, alloy, and stainless steels; and non-ferrous materials: production in Rockwell's own modern, carefully supervised foundries provides excellent quality control.



Rockwell PERMATURN valves are also available in the inverted plug Hypreseal® design for high pressures. Low torque operation is assured by plug coating of high lubricity and bearing-guided stem. Other features are plastic stem sealing (A), fitting for "push-button" seat replacement (B), and thrust assembly (C) for controlled plug adjustment.

The secret of the Roc

PERMATURN® valve's ver

The unique design feature that makes the Rockwell PERMATURN valve line applicable to all valve services is its coated plug.

Developed after five years of extensive testing, the coating has an extremely low coefficient of friction and is applied in such a way that it is *permanently bonded to the metal surface of the plug.* This tenacious lubricating film gives *permanent separation of metal surfaces* of plug and body: the valves literally cannot stick or freeze.

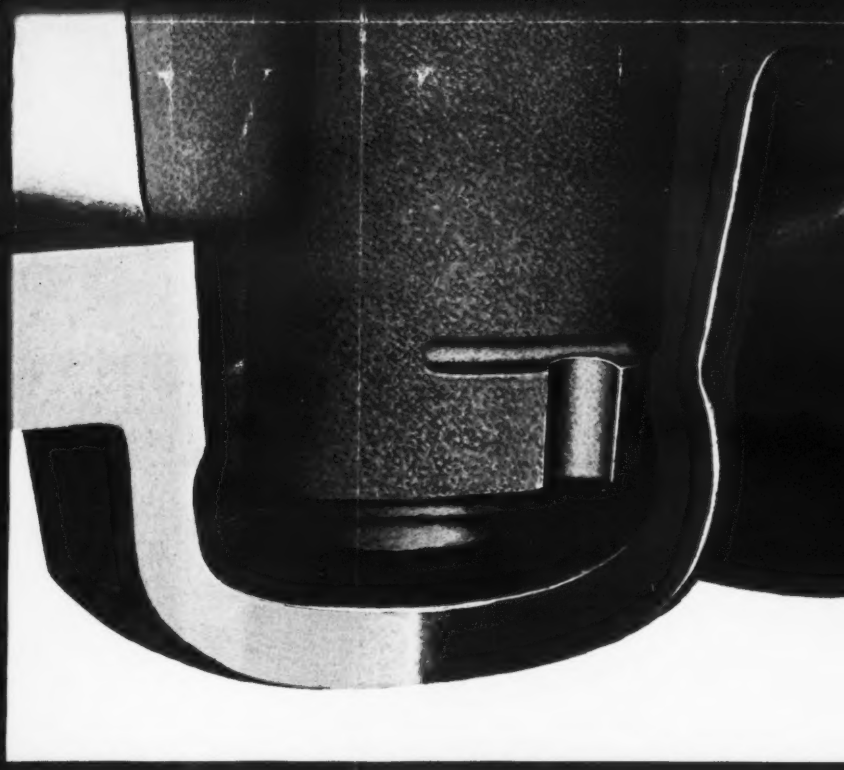
The inert nature of the plug coating assures permanent lubricity for easy, sure operation of the PERMATURN valve at all times. Combined with the many other new design features described above, the plug coatings giv valve these versatile

Attention-Free P fluids handled do n

Easy, 90°-Turn O even where remote tion are involved.

"Push-Button" Sea usefulness without co

Drop-Tight Sealing this feature is all-in



et of the Rockwell
N® valve's versatility...

kes the Rockwell able to all valve

xtensive testing, coefficient of fric- that it is *perma- of the plug.* This *manent separation* the valves liter-

ting assures per- operation of the . Combined with described above,

the plug coatings give the Rockwell PERMATUF valve these versatile application benefits:

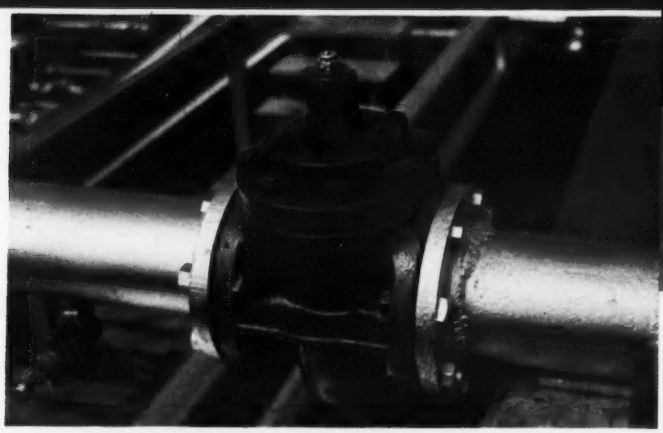
Attention-Free Performance in services whe fluids handled do not require a special valve.

Easy, 90°-Turn Operation in all valve servic even where remote operation or infrequent atte tion are involved.

"Push-Button" Seat Replacement extending val usefulness without costly downtime and maintenanc

Drop-Tight Sealing for critical applications whe this feature is all-important.

Structural Design of the PERMATURN valve is the strongest of any valve available today: body ribbing gives complete freedom from distortion at rated pressures and temperatures.



Rockwell semi-steel PERMATURN valves are shipped with a distinctive red primer paint that has wide compatibility.

Steel PERMATURN valves are given a gray prime coat: both colors give good corrosion-protection in storage and in service.

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TURN

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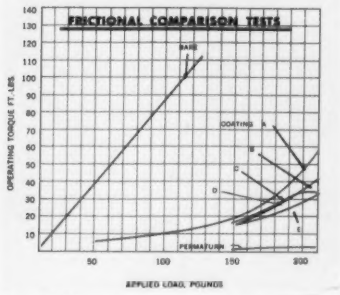
Only Rockwell, world leader in valve research, could have developed the PERMATURN® valve

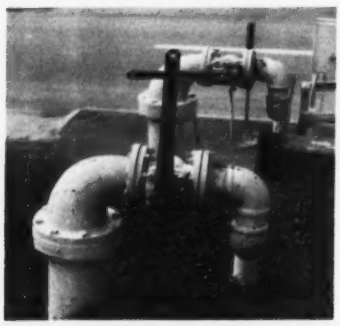
For more than forty years, Rockwell has pioneered in valve research. This background of experience, which made the Rockwell-Nordstrom lubricated plug valve the world's standard of quality, led to the five year development program on the PERMATURN valve, a new concept in versatile, all-purpose valve design.



Part of this study concerned the various characteristics of many compounds considered for the plug coating medium. Exhaustive mechanical and chemical resistance tests, and carefully measured frictional comparisons, led to the selection of a material which has proved its ability to stand up under tough service for years of normal valve operation.

Complete production facilities for the new PERMATURN valve have been installed at Rockwell's nationwide valve manufacturing plants. The equipment shown above was specially developed to coat the plugs of Rockwell PERMATURN valves on a production line basis and is typical of installations at other Rockwell plants.

Rockwell PERMATURN® valves have been customer-proved before introduction



NO ATTENTION has been given these Rockwell PERMATURN valves on hydrocarbon service in the year and a half since their installation. Operation is positive and easy—and shut-off is still as bottle-tight as the day the valves were installed.

JET FUEL is handled by these Rockwell PERMATURN valves, in service since 1960. Operators have found the plug coating of PERMATURN valves gives smooth, easy operation—and has reduced sealant injection needs from once-a-week to once every three months.

SURE OPERATION on tough services has been proved by pilot installations of PERMATURN valves across the country. The coated plug supplements a regular program of sealant replacement, needed in these services for long valve life, to assure low-torque operation at all times.

Rockwell Manufacturing Company
Pittsburgh 8, Pennsylvania

I'd like to have your "Pocket Valve Guide" with brief specs and coverage charts on Rockwell PERMATURN valves.

Name_____ Title_____

Firm_____

Address_____

City_____ Zone_____ State_____

ROCKWELL PERMATURN VALVES
another fine product by
ROCKWELL

over the editor's shoulder

Chemical Show a "must" for operating management

The now familiar pattern for chemical companies that developed during the two years that have passed since the last Exposition of Chemical Industries in 1959 has been one of new sales records and declining profits. It's an old story of "costs are up, and profits are down." You, as operating-management men in the CPI, are charged with the responsibility of producing the best possible product at the lowest possible cost. You cannot fail to recognize the challenge this situation presents.

The burden of meeting this challenge rests squarely on your shoulders. It's your task to learn all you can about equipment and process improvements aimed at fighting these rising costs. The Chemical Show, this year, will be more fruitfull ground than ever for reaping a harvest of cost saving ideas.

Tangible evidence of the progress that is being made in halting, or even reversing, the increased costs trend will be available for all to see at the 28th Exposition of Chemical Industries being held in the New York Coliseum, November 27 through December 1.

The Editors of CHEMICAL PROCESSING magazine have been laboring hard to help you best utilize your time at the Show, if you can attend, or to bring you its highpoints if you cannot.

For those of you fortunate enough to be journying to New York, the special "tear out" insert we have prepared should prove of particular value in helping you plan your Show visit. Look for it opposite page 74.

If you're not able to attend, you'll find write-ups of specially selected exhibited products in each section of this issue, tagged for easy identification.

Theodore H. Reed

Associate Editor

For more information on product at left, specify 1610. "See our exhibit at the Chem Show"

Want to be an Executive?

Management is actively looking for engineers who have the desire and ability to become administrators

by
James M. Jenks

In a sense, this is the golden age for engineers. Once buried in corporate obscurity, many of them have emerged today as likely heirs apparent to the big jobs—and the big rewards—of business and industry. One impressive indication of this growth is that money spent in research and development over the past fifteen years has increased six-fold.

Despite this stepped-up activity, however, the once disorganized scramble for engineers seems to have ended . . . at least temporarily. And perhaps it's a good thing. Actually, the more perceptive engineers had always realized that unusually high starting salaries were often illusory. The gap between money being offered beginners and the incomes of experienced men was narrowing rapidly. Further, more and more thinking technical men concluded that even top engineering salaries are low when compared with the remuneration of highly placed general executives.

A Plan to Help the Engineer Succeed

Happily, there is a route to increased incomes that is satisfying to both engineer and company alike. This route leads into *management*. It is no easy road but the rewards are great for those willing and able to follow it.

In the vast, complicated world of business the engineer has much to learn. As a manager his duties will bring him into contact with accountants and buyers, advertising men and salesmen, lawyers and other executives. A strange new set of circumstances confronts him. He must gain confidences and be understanding, learn and instruct, be sympathetic, paternal or commanding as conditions require . . . and all in the midst of a business organization about which his knowledge is limited.

Actually, it comes down to this: To succeed as a business executive, the engineer must learn the art of making decisions quickly and accurately. And this ability is, of course, directly dependent upon knowledge. The "principles" of business—while not as scientific and inexorable as those of engineering—are no less important . . . no less essential to efficient procedure.

For nearly fifty years, the Alexander Hamilton Institute has specialized in bringing this knowledge to mature men—at home in their spare time.

Free . . . "Forging Ahead in Business"

We do not claim that you must have the Alexander Hamilton Course in order to succeed in business. But we do say that *you cannot succeed without what is in the Course!*

All the Institute does is offer you a convenient and time-saving means of bringing this knowledge to you in your spare time; and in a form that has *proved* to be practical and effective.

So that you may judge for yourself whether or not you think the Institute can help you, we have published an informative 48-page book titled "Forging Ahead in Business."

We believe that this little book will help any man get down to bedrock in his thinking; however, there's no cost or obligation for it because—frankly—we've never been able to put a price on it that would reflect its true value. Some men have found a fortune in its pages.

If you would like a complimentary copy of "Forging Ahead in Business", simply sign and return the coupon below. It will be mailed to you promptly.

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Dept. 343, 235 E. 42nd St., New York 17, N.Y.
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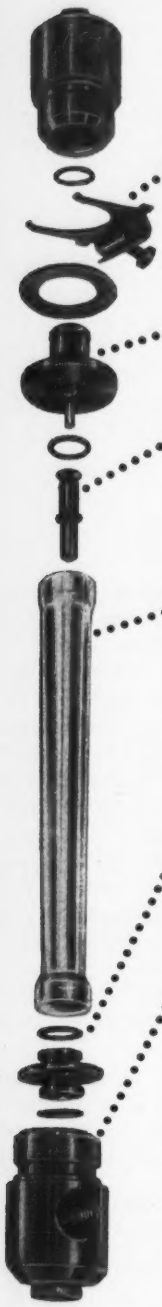
Before You Buy Any Rotameter

CHECK THESE 6 IMPORTANT POINTS...



1 Tube clamp—should hold tube externally, leave nothing in the flow path to foul the meter or corrode. Should lock the tube so vibration can't unseat it. Varea-meter tubes can't be unseated. They're locked by this external, lever-type clamp. There's nothing in the flow path; tubes slide out after one bolt has been loosened.

2 Tube adapters—should never bind when tubes are removed. The W&T Varea-meter's no-binding adapters let tubes slip out easily without danger of breaking.

3 Float—should be designed to pass the greatest amount of fluid with accuracy, to promote pressure recovery. The shape of the Varea-meter's new high-efficiency float restricts flow less, heightens accuracy. It also smooths fluid expansion after the metering disc for a lower pressure drop across the float. Eight or more floats per tube size give a wide choice of capacities.

4 Tube—should have a diameter 1.4 times the float diameter to permit maximum throughput for its size. The Varea-meter tube does. Size for size, the new Varea-meter gives more capacity than any other rotameter. Thus, for any capacity, the smaller Varea-meter costs less.

5 O-ring seals—for convenience, should be the same size throughout the rotameter. Varea-meter O-rings are. Since tubes are the same size at both ends, O-rings are identical. The plug for the vertical clean-out seats against another same-size O-ring. Plug threads can't corrode.

6 End fittings—should permit piping from all angles; should be quickly removed without breaking down the frame. For convenience, Varea-meter end fittings rotate through 360° and clamp in any position. They are quickly and cleanly removed by loosening a C-ring clamp.

And **frames** should have strength to protect metering components, permanence to live with corrosion. Varea-meter frames are one rigid piece of corrosion-resistant, welded stainless steel. Unitized construction absorbs pipe strain, preserves metering accuracy.

New Wallace & Tiernan Varea-meters measure up to 310 gpm water or 1300 scfm air over a range of at least 10 to 1. Magnetic indicators, transmitters, and accessories are available.

For more information, write Dept. V-8.22.

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Spotlight On People

General Aniline and Freeport shuffle top executives

John I. Snyder Jr. has succeeded Thomas A. Morgan, retired, as chairman of the board and chief executive of General Aniline & Film Corporation. Snyder had been serving as vice chairman. **Ross D. Siragusa** succeeds him in that capacity. **Philip M. Dinkins** continues as GAF president.

Robert C. Hills moves up from executive vice president to president of Freeport Sulphur Company, succeeding **Charles A. Wight** who becomes vice-chairman of the board. Hills joined the company in 1934 as an assistant chemist.

Arthur Minich shifts from president of the Nuodex Products Division to president of the Heyden Chemical Division of Heyden Newport Chemical Corporation. He succeeds R. M. Aude, deceased. In the Nuodex Division, **William J. Houston** has been named executive vice president and Dr. **H. W. Schultze**, technical director.

C. Gordon Jelliffe, who joined Borden Chemical Company when his firm, Columbus Coated Fabrics, was acquired by Borden Chemical earlier this year, has been named a vice president of the parent company. As president of Columbus Coated, Jelliffe is that company's chief executive.

Associate manager-research for Union Carbide Corporation since 1959, **Clarence E. Larson** is returning to Oak Ridge National Laboratory as general manager and vice president of Union Carbide Nuclear Company. He was formerly associated with the Oak Ridge operations from 1943 to 1955.

John W. Laibe, has been named manager of The Enjay Chemical Company's Chemical Raw Materials Division. Enjay is a division of Humble Oil & Refining Company.

The Ohio Oil Company's newly established Chemical Product Development Division is being headed by **W. H. Barlow,** manager of research and planning and member of Ohio Oil's board since 1959. Barlow has been elected vice president and will oversee the company's chemicals, planning and research organization. Dr. **R. H. Reitsema** is manager of the division.

At Cary Chemicals Inc., **Gordon Rozand** has been appointed director of manufacturing and **James C. Hahn,** works manager for Cary's 100-million-lb/yr polymer plant currently under construction at Burlington, New Jersey.

S. A. Ballard is now R&D manager for Shell Chemical Company's Industrial Chemicals Division.

Ansul Chemical Company has named **Edward N. Heger** manager of chemical manufacturing at Marinette, Wisconsin, and **Charles F. Abendschein** plant manager for Ancon Chemical Corporation at Lake Charles, La. Ancon, jointly owned by Ansul and Continental Oil Company, is building a 60-million-lb/yr methyl chloride plant at Lake Charles.

Appointed general manager of the Ethylene Oxide Chemicals Division of Houston Chemical Corporation is **A. K. May.**

Edward A. Knaggs moves up from associate technical director to director of research for Stepan Chemical Company's industrial chemicals division.

Filling a newly created position of manager of new ventures for Du Pont's Film Department is Dr. **Raymond C.**

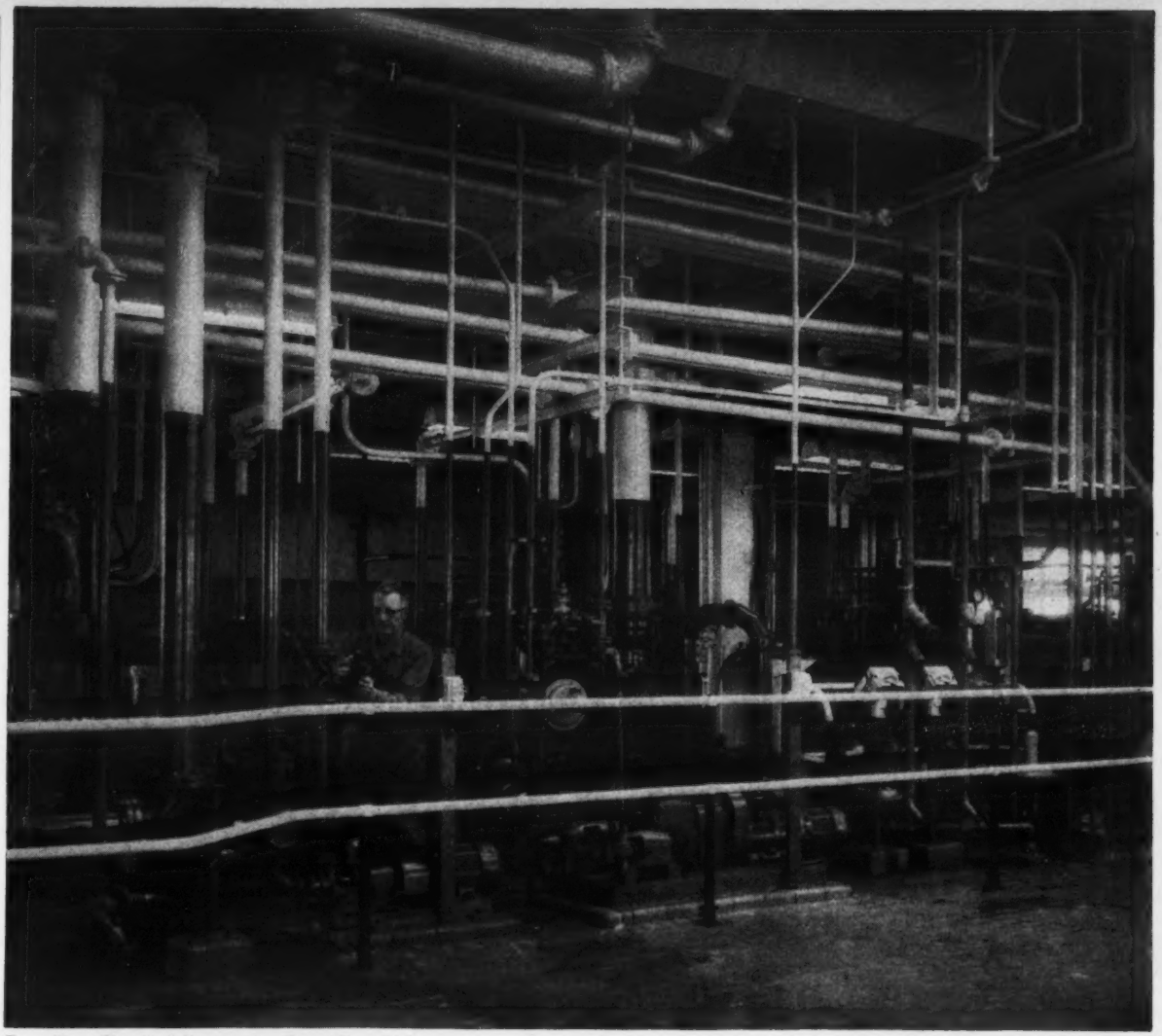
Grills, formerly vice president and general manager of Du Pont's Argentine subsidiary, Ducilo, S.A.I.C. Dr. Grills will be responsible for investigating and evaluating new opportunities and for initiating new commercial ventures for films.

Monsanto Chemical Company has announced two appointments in its Agricultural Chemicals Division. **Joseph W. Gillespie** will manage the company's ammonia plant being built at Muscatine, Ia. **Thomas S. Hostetter** has been named plant manager for the El Dorado, Ark., plant.

As newly-named project manager of SunOlin Chemical Company's engineering staff, **Bernard J. Williams** will direct engineering for all auxiliary plants connected with SunOlin's $20-million ethylene and ethylene oxide plants under construction at Claymont, Del.

In Allied Chemical's General Chemical Division, the following changes have been announced: **Joseph E. Abhold,** superintendent of Anacortes, Wash., works; **George M. Feeser Jr.,** plant manager, Baker & Adamson works; **William C. Ruch,** director of development research; Dr. **Robert W. Mason,** director of laboratory research, and **Charles D. Boyer Jr.,** director of planning research, all stationed at Morris Township, N.J. ■

"It'll be great when we get the 'bugs' out of it."



Toms River Chemical Corporation, Toms River, N.J.

SARAN LINED PIPE—no failure after 10 years carrying hot acid loads

Thousands of feet of pipe carry a constant flow of corrosive acids, wet chlorine, sodium hydroxide . . . at temperatures ranging as high as 185° F. . . . where downtime can't be tolerated. Here in the dyestuffs plant of Toms River Chemical Corporation, Toms River, N.J., Saran Lined Pipe delivers its reactive loads year-in, year-out, and needs no time out for repairs.

"Even after 10 years, Saran Lined Pipe needs no replacement or repair," say company officials. "The only maintenance has been cleaning and exterior painting, with occasional servicing of the saran lined valves. For our plant conditions, this is the best, most economical carrier for most of the acids and chemicals we use—HCl, H_2SO_4, SO_2, Cl_2, NaOH, and others.

"Unlike other kinds of piping, we can easily cut and assemble Saran Lined Pipe in the field. When errors in measurement occur, they cost far less to correct with Saran Lined Pipe than with other kinds."

For carrying even the most corrosive of chemicals, consider Saran Lined Pipe. Saran Lined Pipe, fittings, valves and pumps are available for systems operating from vacuum to 300 psi, from below zero to 200° F. They can be easily cut, modified and fitted in the field without special equipment. For more information, write Saran Lined Pipe Company, 2415 Burdette Avenue, Ferndale, Michigan, Dept. 1564LG11.

THE DOW CHEMICAL COMPANY DOW Midland, Michigan

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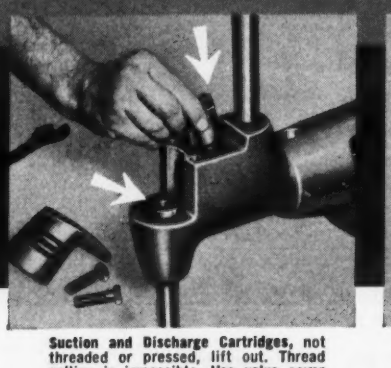
E-Z CLEAN VALVES...

Perform better... Last longer...

MORE GOOD REASONS FOR THE SUPERIORITY OF AMERICAN CONTROLLED CAPACITY PUMPS

Quick, Easy Accessibility by simply unscrewing two screws, removing cover. Screws are not exposed to process fluids, in no way disturb piping.



Suction and Discharge Cartridges, not threaded or pressed, lift out. Thread galling is impossible. Use valve cover screw as a tool to lift out cartridge.

Triple Seat Design literally improves valve efficiency with wear. Top seat guides ball, virtually eliminating wear on second and third seats.

E-Z CLEAN Valves mean maximum convenience for inspection, cleaning or replacement, actually can be changed in minutes. Valves are available in a variety of corrosion-resistant materials for a wide range of operations. Exclusive American design enables valves to be changed readily without disconnecting piping.

SPRING LOADED design increases volumetric efficiency, reduces back-flow and destructive shock-forces due to inertia. Spring reduces time required for complete valve closing, minimizing back-flow and improving accuracy. Spring-loaded valves are particularly effective with slurries and high viscosity liquids.

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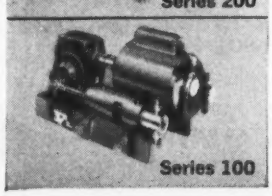

American Controlled Capacity Pumps are available in three Series illustrated at left—electric and air-operated, wide pressure and capacity ranges. Series 300 Pumps are externally adjustable *while in operation* by a stationary hand-wheel. Internal adjusting mechanism is immersed in oil. Available for automatic adjustment or pneumatic and electric control. Designed and manufactured with American's unmatched skill and experience, these pumps perform with maximum precision, less downtime, lowest possible maintenance and low parts inventory. Write for complete information.

AMERICAN METER COMPANY
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pump division
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that's interesting

External combustion motor may come into its own

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The 389-page study (Order 61-11187) is available for $3 from the Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C.

For more information on product at right, specify 1615 opposite last page

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Wolverine TRUFIN® and STEEL ..go together—naturally!

In many applications—design and operating engineers are finding that they can cash in on money-saving benefits by specifying Wolverine Trufin Type S/T (19 fins per inch) in seamless steel.

Trufin—in steel—possesses all of the inherent advantages of integral finned tube. For example:

* **In new installations**—Trufin lets you design smaller exchangers without sacrificing capacity. You save on shells, headers, baffles, supports, etc.
* **When retubing**—Trufin's extended surface makes it possible to dramatically increase the capacity of existing exchangers. Trufin Type S/T can be substituted directly for bare tube.
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Trufin is produced in many types, sizes, and fin spacings-and in steel, copper, copper alloys and aluminum.

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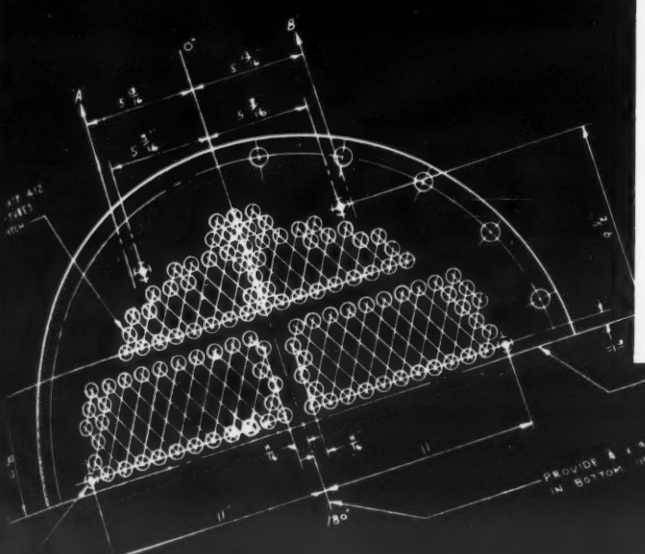

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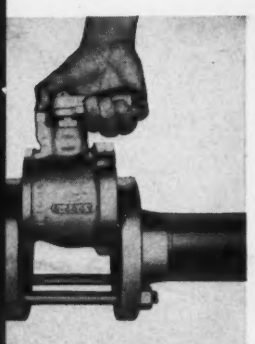

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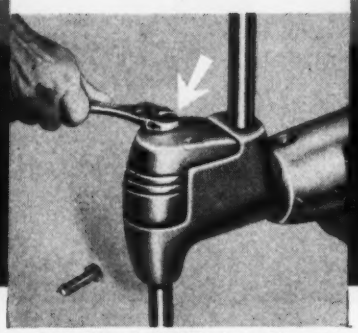

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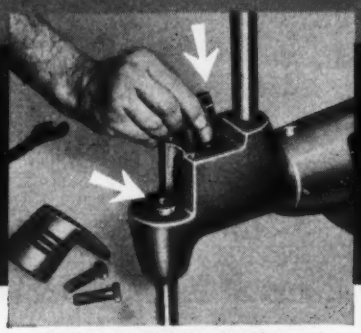

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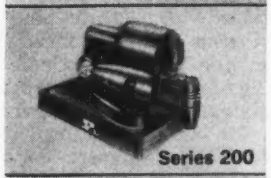

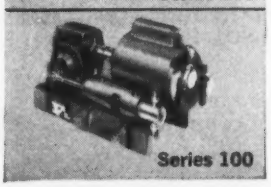

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Trufin—in steel—possesses all of the inherent advantages of integral finned tube. For example:

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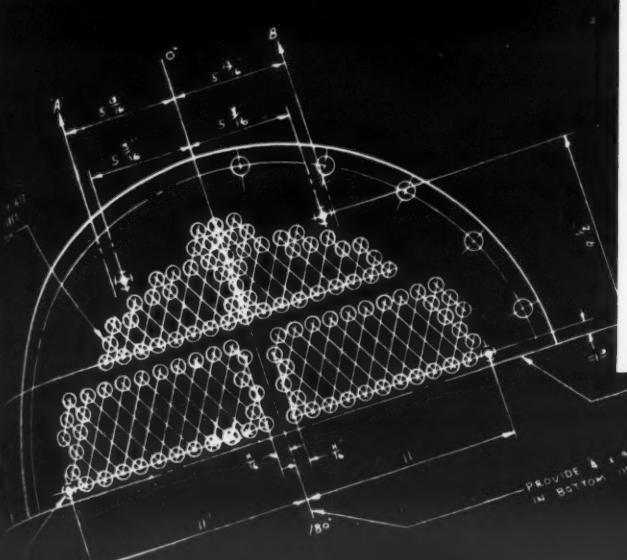


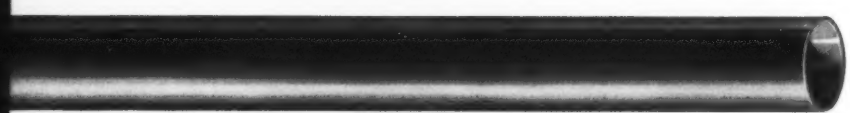
Look to Wolverine for the complete line of finned tube

Trufin Type S/T | Trufin Type W/H | Trufin Type S/T (Duplex) | Trufin Type L/C (Bimetal) | Trufin Type H/R | Trufin Type H/A | Trufin Type I/L

Only Wolverine Tube Division of Calumet & Hecla, Inc. can supply you with such a complete line of integrally finned tube – seven different types designed to bring increased efficiency to a wide variety of heat transfer applications. Each type is available in a complete range of sizes and alloys. Ask your Wolverine salesman for information about how these outstanding tubes can help you.

WOLVERINE ALSO OFFERS SPECIAL SERVICES AND SPECIAL PRODUCTS

Wolverine's Field Engineering Service is staffed with specialists trained in tubing selection, alloys, metallurgy, equipment design, etc. Also available for consultation are Wolverine's Heat Transfer Specialists who are located throughout the major processing areas. The services of all these men are yours —without obligation.



. . . AND, OF COURSE, WOLVERINE TUBE also manufactures a complete line of copper, copper alloy and aluminum prime surface condenser tube. Ask your Wolverine sales representative about Wolverine's complete line of products and services.

Wolverine Tube is also a prime mill source for palletized U-bend condenser tubes—manufactures them to your "specs" and ships them to you in disposable box-type pallets so that you can feed directly from pallet to condenser.

WOLVERINE TUBE
DIVISION OF
Calumet & Hecla, Inc.
DEPT. S, 17234 SOUTHFIELD RD., ALLEN PARK, MICH.
TUBEMANSHIP in Copper—Copper Alloys—Aluminum—Special Metals

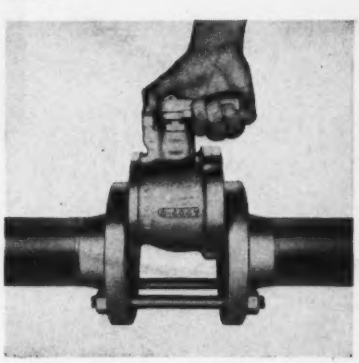
PLANTS IN DETROIT AND INKSTER, MICHIGAN AND DECATUR, ALABAMA. SALES OFFICES IN PRINCIPAL CITIES

A 3" Econ-O-Miser Ball Valve Controls Abrasive Slurry at Pantasote Company

The combination of several unique design features of the Flange Econ-O-Miser Ball Valve helped solve a troublesome problem at Pantasote Company, Passaic, New Jersey, makers of polyvinyl chloride resin. This fluid, actually a granular solid slurry, required a valve with a wiping action. With the Econ-O-Miser design, the ball is wiped clean by the seats each time the valve is operated eliminating the danger of binding or of trapping solid material. A ball valve was selected over a gate valve because the ¼ turn feature allows operation from the floor by using a lever, and the position of the lever indicates whether the valve is open or closed.

The body of the Econ-O-Miser ball valve mounts directly on the flange of the vessel, without the usual flange pipe end. This eliminated any dead space where "puddling" could effect the reaction. Econ-O-Miser Ball Valves can provide similar installation advantages, superior performance, and substantial dollar savings for you!

Econ-O-Miser Flange Ball Valve . . . 3" Size Illustrated. Size Range . . . ¼" through 6". Seat and Seal Materials . . . Buna-N, Teflon and Neoprene. (Other Materials Available.)



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WORCESTER VALVE CO., INC.

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Watching Washington

Army Tempts Sulfur Firms with Dollars & Data

SNIFFING OUT PROFITS — If your firm works in sulfur chemistry, it might prove profitable to contact the Army Medical Service's anti-radiation-drug program. Such contact may result in an outlet for some of your research, might bring you a contract for preparation of compounds, or at the very least help keep you abreast of new developments in your field.

When the program got underway at the Walter Reed Army Institute of Research (Washington, D.C.), the Air Force already had evaluated 1500 compounds and selected 56 as most likely having the needed sulfhydryl group—two or three carbons aliphatically removed from some alkaline nucleus.

The Army program concentrated on these compounds and narrowed the list considerably. At present, the Army considers a small group to exhibit very good anti-radiation-damage properties. However, each displays extremely toxic side effects.

Until recently, most doses large enough to protect humans from radiation damage were lethally toxic. The program's staff at Walter Reed has greatly widened the spread between effective dose and toxic dose. This has been done by working with compounds prepared under 35 outside contracts. Among the contractors are Phillips Petroleum and Michigan Chemical.

The Army Medical Service R&D Command is nearly ready to begin clinical use of some of the compounds on human volunteers. In the meantime, the program, which spends a little over $1 million per year, needs to be kept abreast of developments in sulfur chemistry. An excellent source of information, says the Army, is that portion of the chemical industry interested in sulfur.

All information revealed to the Army is classified "Commercial Discreet," which in actual practice carries more safeguards than high military secrets. This, says Maj. Michael P. Dacquisto, director of nuclear medicine, WRAIR, is the only way the Army can reasonably expect industry's confidence.

In return for this information industry can expect certain Army help on industry problems. The Army cannot divulge what it learns from other companies, but it can tell your sulfur chemists what the Army's staff has learned during its own work. Likewise, the Army can give you valuable reports on toxicity and other safety features of your new sulfhydryl compounds in return for letting the Army have a look at them.

These are studies that many industrial laboratories are not equipped to make, and which are expensive to buy from consulting laboratories. The contacts are Maj. Dacquisto or the program's chief, Dr. David P. Jacobus, Walter Reed Army Institute of Research, Washington 25, D.C.

THE HARD COLD FACTS — Users or producers of cryogenic materials, or manufacturers of materials for use at cryogenic temperatures, can now take advantage of a nine-year study of basic cryogenic properties made by the National Bureau of Standards for the Air Force.

Results of the Bureau of Standards work have been compiled as the latest revision of the "Cryogenic Materials Data Handbook." The new volume, considered a "basic handbook" is the eighth in a series of compilations and supersedes all previous editions.

The handbook discusses 22 properties of metals, alloys, and non-metallic materials at cryogenic temperatures, including some previously unpublished laboratory test data. Most of the materials and properties listed are related to missile work, but some others are listed because of their potential uses. Included are various types and groups of aluminum, cobalt, copper, iron, nickel, titanium, carbides . . . and non-metals such as ice and plastics, beryllium and molybdenum.

Also included is a summary of the testing procedures used at the Bureau's Cryogenic Engineering Laboratory (Boulder, Colo.). The 555-page "Cryogenic Materials Data Handbook" is available for $7. Order PB 171 809 from the Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.

In the future, the handbook will be sup-

compare

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plemented twice a year. The first supplement (PB 171 809-1, $1) already is available. Future semi-annual supplements will be sold at $2 each, or on subscription at $4 per year.

SHADES OF 'CRACKERJACK' — Chemical processors engaged in drug manufacturing and distribution will face one additional cost of doing business next year. Beginning March 5, 1962, Food and Drug Administration will require drug manufacturers to employ "package inserts" providing detailed information for pharmacists and physicians.

The new regulation requires the inserts to provide more information than is contained on the label of most drugs. It is to cover all necessary information for safe effective use of the drug, including any information as to when its use would not be safe.

FDA earlier had asked for industry and professional comments on the regulation when it was in the proposal stage. Industry objections generally were to the effect that the inserts would substantially increase costs. FDA countered that this would amount to only a small part of the present cost of drug promotion.

The chief professional objection was that the package inserts might result in professional literature getting into the hands of laymen. Consequences for both physicians and patients could be undesirable. FDA's answer was to rely on pharmacists' professional responsibility to dispense drugs in accordance with the physician's instructions.

PREPARE FOR INSPECTION — Many CPI concerns who hold Atomic Energy Commission licenses for use of radioactive materials and construction or operation of reactors soon will begin dealing with different field compliance inspection offices. Some processors will continue to deal with the offices that now inspect their facilities, but may start working with different personnel.

As soon as arrangements can be completed, AEC will consolidate licensee compliance inspections into five regional areas. Previously, the Commission has maintained compliance inspection staffs at eight of its operations offices: New York, Chicago, San Francisco, Savannah River (Aiken, S.C.), Oak Ridge, Idaho Falls, Albuquerque, and Hanford (Richland, Wash.).

Savannah River and Oak Ridge compliance inspection areas will be combined into a single regional offce at Atlanta. The Albuquerque and Idaho Falls areas will be handled out of Denver. The San Francisco area will be expanded to include the inspection area formerly served by Hanford.

Under the reorganization, the five regions will be:

REGION I — New York City:
Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont.

REGION II — Atlanta:
Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Panama Canal Zone, Puerto Rico, South Carolina, Tennessee, Virginia, Virgin Islands and West Virgina.

REGION III — Chicago:
Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio and Wisconsin.

REGION IV — Denver:
Colorado, Idaho, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah and Wyoming.

REGION V — San Francisco:
Alaska, Arizona, California, Hawaii, Nevada, Oregon, Washington and U.S. territories and possessions in the Pacific.

LIGHT READING — The latest Atomic Energy Commission semi-annual price list of all unclassified research reports for sale is now available. The 50-page "Atomic Energy Commission Research Reports" lists more than 3,500 AEC reports to July 1961. The list may be obtained free from Office of Technical Services, U. S. Department of Commerce, Washington 25, D.C. Request "AEC Research Reports Price List No. 36."

The Office of Technical Services also publishes a semi-monthly journal that describes all AEC, Army, Navy, Air Force and other Government Agency research reports as soon as they are available to the public. "U.S. Government Research Reports" may be ordered on subscription from the Superintendent of Documents, Washington 25, D. C. at $15 per year. (Add $3.75 for foreign mailing.) ■

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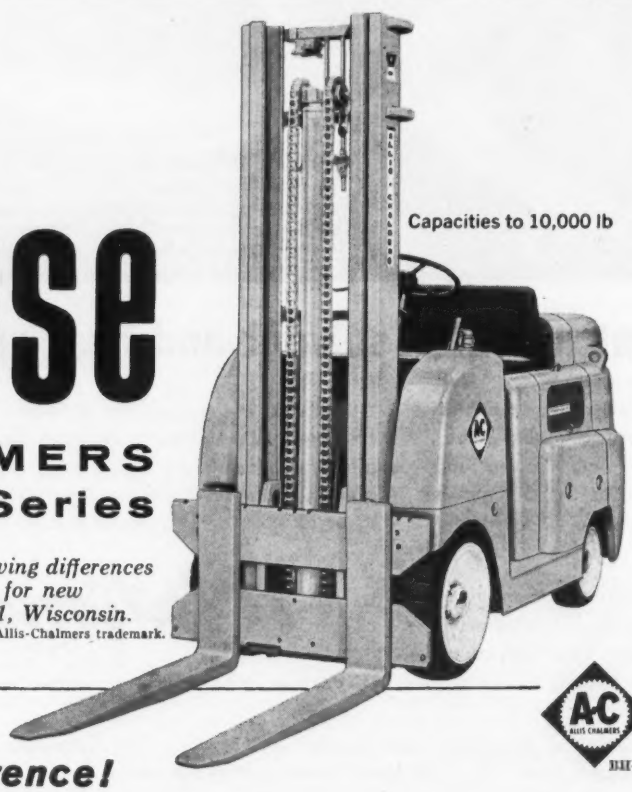

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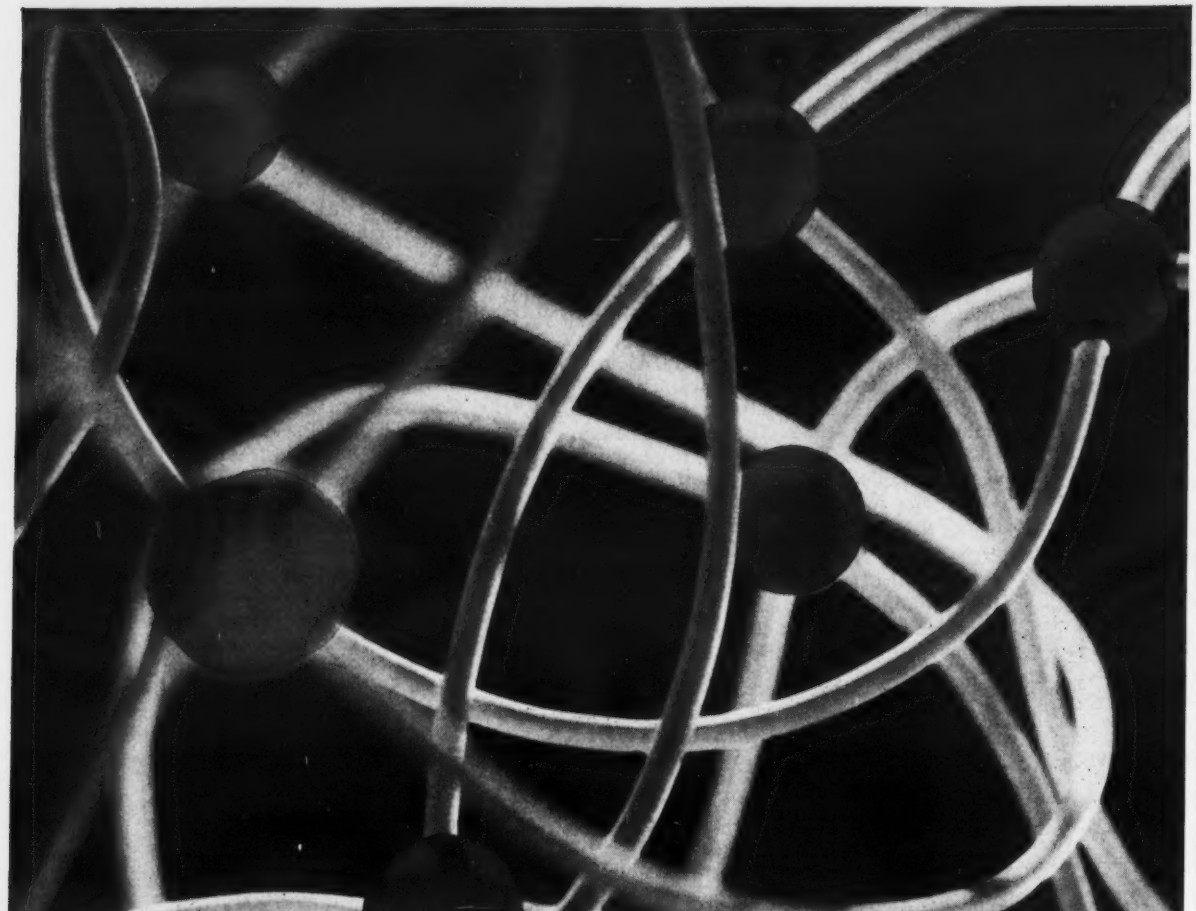

A graphic portrayal of the three-dimensional network that is set up during drying of X-LINK 2833, National's new self-crosslinking copolymer latex. This network binds the molecules to one another by chemical bonds and prevents them from flowing past one another upon application of a load.

major improvement in water, solvent and heat resistance

Time again to take a fresh look at vinyl and acrylic properties. National's new X-LINK 2833—a self-crosslinking vinyl-acrylic copolymer latex—substantially improves water, solvent and heat or creep resistance. It also improves film strength. It broadens the scope of practical applications for vinyls and acrylics.

X-LINK 2833 is self-reactive. It crosslinks rapidly upon drying without the addition of thermosetting resins. Eliminates problems of limited stability, odor, compatibility and high curing temperatures usually associated with formulated products.

X-LINK 2833 is suggested for nonwoven binders, wallpaper coverings, asbestos beater addition, paper saturation, vinyl organosol tie coats, adhesive uses, awning coatings, pulp molded products and specialty coatings for textiles and paper. Write for complete technical information.

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Check 1618 opposite last page.

recent books

Compiled from the work of 171 contributors, "Biochemists' Handbook" presents in a concise form a wide range of biochemical data both qualitative and quantitative. Compiled chiefly for the use of biochemists, both in the academic world and in industry, it can also be a useful work of reference for chemists, botanists, chemical pathologists and physiologists. Single volume of 1192 pages includes topics of physical and organic chemistry most useful to biochemists: enzyme kinetics with a description of about 300 individual enzymes; metabolic pathways; composition of animal tissues; physiological and nutritional topics.

To obtain "Biochemists' Handbook" remit $25.00 direct to D. Van Nostrand Company, Inc., 120 Alexander St., Princeton, N. J.

Check 1619 opposite last page.

Expanded fatty acid field is exemplified by the increased scope of the second edition of "Fatty Acids." Work is now being published in four parts. Part II, the current volume, deals with salts, esters, polymerization, halogenation, hydrogenation and oxidation. To increase usefulness of the series, pagination will be consecutive from first to last volume.

To obtain "Fatty Acids: Chemistry, Properties, Production and Uses, second edition", remit $27.50 to Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N.Y.

Check 1620 opposite last page.

Chemical effects brought about by absorption of ionizing radiation in gases is subject of 314-page monograph. Present volume, by S. C. Lind, is partly a revision and an extensive enlargement of monograph No. 2 of the American Chemical Society, published in 1921 and revised in 1928. First five chapters present essentially introductory material on the physical principals, while final ten chapters deal with experimental work. Numerous graphs and tables accompany the text and all are numbered for convenience in the table of contents.

To obtain "Radiation Chemistry of Gases" remit $12.50 directly to Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.

The mechanical behavior of structural materials at elevated temperatures are dealt with in 529-page book. Its 15 chapters are written by recognized experts in the field. The complete works was edited by John E. Dorn, Professor Materials Science, University of California at Berkeley. Chapters on nature and behavior of dislocations, use of thermodynamics and statistical mechanics for developing basic concepts of dislocation processes for creep, and discussions on theories for fracture

and fatigue are presented. The book is designed to serve either as a text or reference.

To obtain "Mechanical Behavior of Materials at Elevated Temperatures" remit $14.50 direct to McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, N. Y.

If compressed air or gas is your concern, then you will be interested in the new expanded and completely revised Third Edition of the "Compressed Air and Gas Handbook". Data is presented in form of curves or tables whenever possible.

Management will find the sections on air economy and centralized versus multiple-unit compressed-air systems useful. Operating men will want to refer to the articles on maintenance schedules, lubrication, starting-up new compressors and others.

Copies of "Compressed Air and Gas Handbook," Third Edition, are available at $8.00 per copy from Compressed Air and Gas Institute, 12th Floor, 55 Public Square, Cleveland 13, Ohio.

Check 1621 opposite last page.

Industrial raw materials for asphalts and allied substances comprehensively treated in 342-page book. This second volume of five includes both foreign and domestic technological developments, voluminous references and bibliographic data. Tars, pitches, pyrogenous asphalts and waxes are treated from the standpoint of composition, various methods of distillation and specific economic uses.

To obtain "Asphalts and Allied Substances" — 6th edition, Volume II, Industrial Raw Materials" by Herbert Abraham, remit $10.75 direct to D. Van Nostrand Company, Inc., 120 Alexander St., Princeton, N.J.

Check 1622 opposite last page.

This is the first book to compile and review all currently available information on infrared absorption of inorganic substances. It brings together in one convenient volume empirical data and interpretations of this important phase of spectroscopy. Table of observed frequencies and discussions are included to emphasize applicability of infrared spectroscopy to structural inorganic chemistry.

Extensive annotated bibliography of 100 pages, with index, covers period from January 1952 through April 1960, constructed largely by searching Chemical Abstracts.

To obtain "Infrared Absorption of Inorganic Substances" by Katheryn E. Lawson, remit $6.75 direct to Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y.

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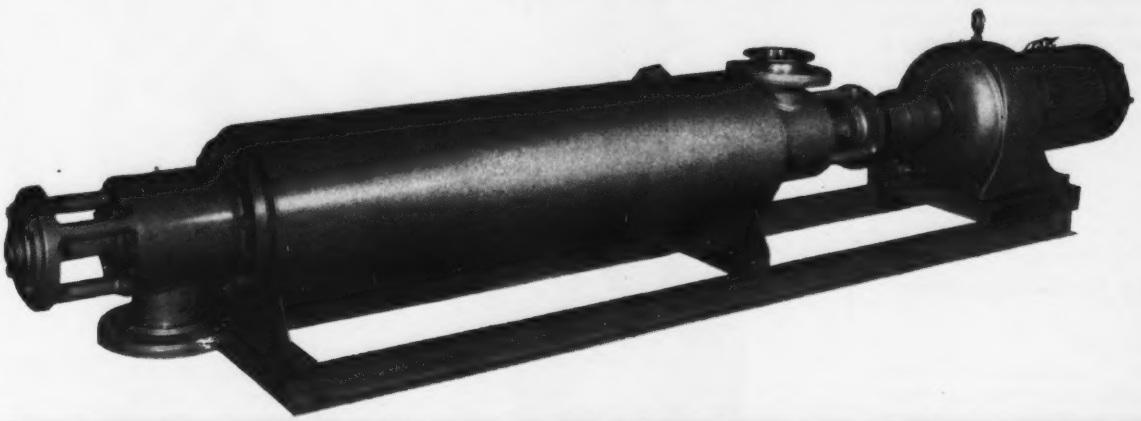

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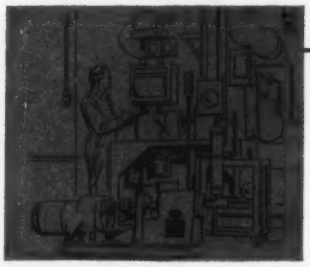

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letters from readers

Gentlemen:

I wish to take this opportunity to congratulate you for your excellent survey on corrosion control as published in the August issue of CHEMICAL PROCESSING. Your articles should point out to industry as a whole, that corrosion control must be an important part of their business.

DAVID N. RICKLES
Chemical Engineer
Highland Park, Ill.

Sugar for coatings article

Sirs:

Mr. Lachmund's article, "Things you should know about maintenance coatings," in your August 1961 issue (p. 54), was the most factual, concise summary of its kind we have seen.

It is refreshing to see that our American industry still has a few individuals who can write clearly, objectively, with complete candor and without floundering in a sea of exaggeration and superlatives.

AUBREY STRICKLAND
Publications and Visual Aids
Coatings Technical Service
Research Department
Archer-Daniels-Midland
Company
Minneapolis

To The Editor:

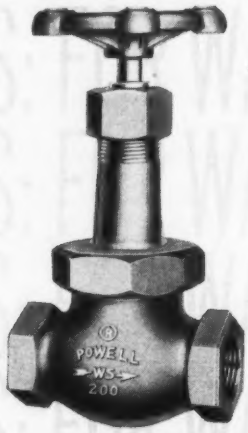
We read with interest Mr. D. O. Lachmund's excellent article on maintenance coatings in the August issue of CHEMICAL PROCESSING. We feel that the author did a remarkable job in condensing the extremely broad field of modern protective coatings into such a succinct, well-written and informative article.

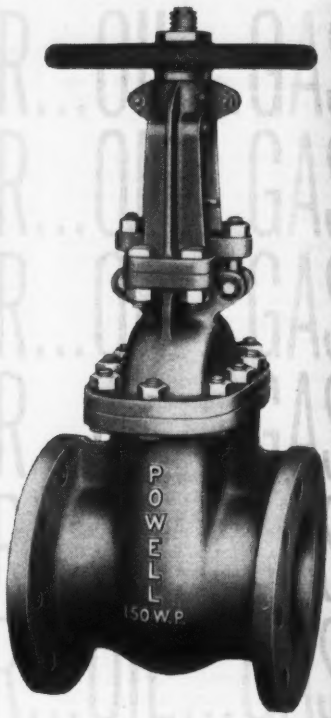
We would, however, like to enter a dissent on some of the statements made on Hypalon coatings in the article. Our company has marketed a Hypalon coating for a number of years with excellent results. While the applied material cost (2¢ - 2.5¢/sq-ft/mil) is marginally higher than a

150-pound W.P. Stainless Steel "Y" Valve—Fig. 2107. Bolted flanged yoke-bonnet, outside screw rising stem. Sizes, ¼" through 3". Also available with screwed or socket welding ends.

125 psi Iron Body Bronze Trimmed Gate Valve—Fig. 1793. Bolted yoke-bonnet, outside screw rising stem, solid wedge, bronze seats. Available with screwed ends and in all iron.

200-pound W.P. Full Flow "WS" Bronze Globe Valve—Fig. 2608. Hardened stainless steel disc and seat. Sizes, ⅛" through 3". Angle and 300-pound valves available.





150-pound W.P. Stainless Steel Gate Valve—Figs. 2453SG (Solid Wedge), 2453DG (Double Wedge). Bolted yoke-bonnet, outside screw rising stem, integral seats. Wedges are fully guided.

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number of other modern protective coatings, it has not proved to be a "disadvantage" when viewed in the light of performance.

Likewise, we are not aware of any "difficulty in application" of Hypalon coatings (or, at least, of our Hypalon coating) which can be applied easily by brush or conventional spray equipment.

We formerly marketed a liquid Neoprene coating in addition to our Hypalon material. However, the former was discontinued after it became increasingly evident that the latter outperformed it as a general anti-corrosive coating and specifically in the fields of ozone and ultraviolet resistance.

In addition Hypalon formulations can be produced in bright clean colors, while Neoprene coatings are either black or drab in appearance.

In short, while we think your article was excellent, we feel that Hypalon coatings were somewhat slighted, and hope you will excuse our rushing to their defense.

NATHANIEL FROTHINGHAM
Sales Promotion Manager
The Wilbur & Williams Company, Inc.
Norwood, Mass.

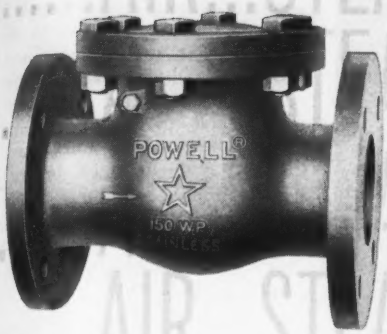
National Potash is not a co-op

To the Editor:

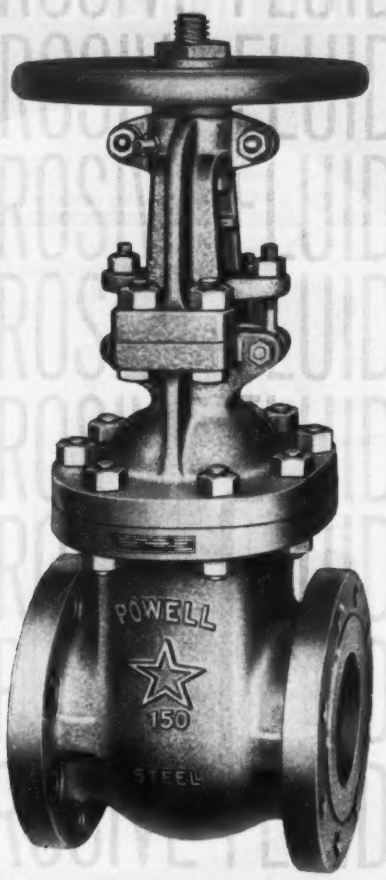
In the may issue (p. 29) of CHEMICAL PROCESSING in the article, "Should co-ops pay 52% Federal income tax?" a box accompanying the article, on page 30, includes National Potash Company in a list of "typical co-op plants for chemical products."

National Potash is not a cooperative. It is simply a potash producing company in which Freeport Sulphur and Consolidation Coal Company share equally about a 95% interest.

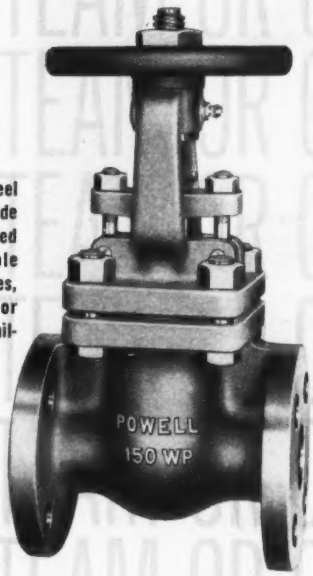
In 1958, National entered into long-term sales agreements with Central Farmers Fertilizer Company which you also listed and which *is*, of



150-pound W.P. Stainless Steel Horizontal Swing Check Valve—Fig. 2433SS. Bolted, flanged cap. Renewable disc, integral seat. Sizes, 2" through 12". Screwed end valves available.



150 psi Steel Gate Valve—Fig. 1503. Outside screw rising stem, bolted flanged yoke-bonnet, flanged ends. Accurately guided solid wedge disc and renewable seats. Sizes, ¾" through 30".



150-pound W.P. Stainless Steel Gate Valve—Fig. 2491. Outside screw rising stem, bolted flanged yoke-bonnet. Interchangeable solid or double wedges. Sizes, ¼" through 2". Screwed or socket welding end valves available.

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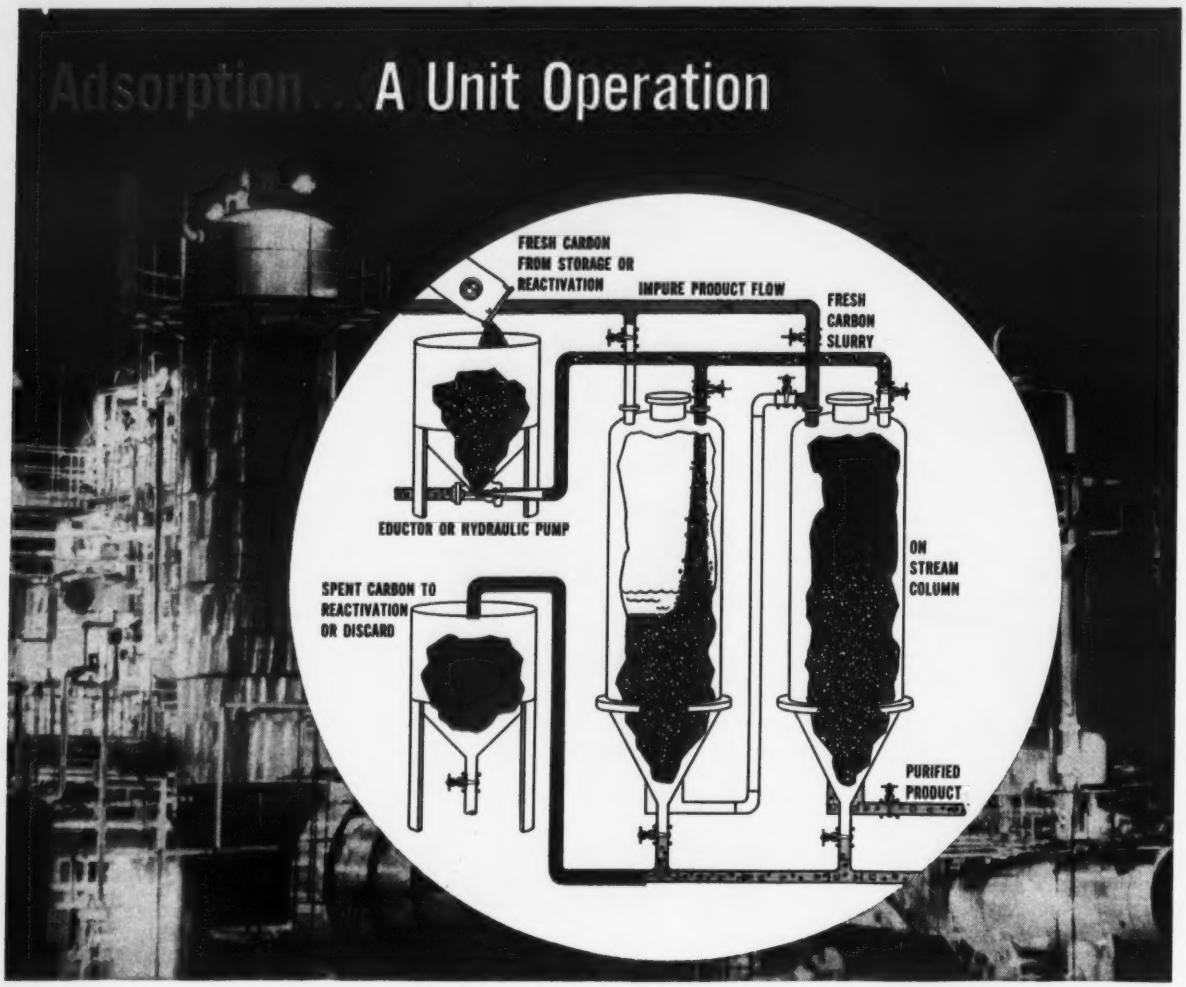

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Check 1625 opposite last page.

course, a cooperative supplying fertilizer materials to its members in the Midwest and Pacific Northwest. Under these agreements Central Farmers undertook to distribute National's Potash and also acquired a small stock interest in National.

It may have been this arrangement which led to your terming National a cooperative, but . . . it is not.

E. C. K. READ
Director of Public Relations
Freeport Sulphur Company
New York

'Rust in Peace' . . .

Dear Sir:

Just a short note to tell you that I thoroughly enjoyed your "'Rust in Peace' . . ." article (August CP, p. 40). I also felt that, in a very brief and concise manner, you have been very successful in stimulating action from ideas.

I never quite thought of setting up corrosion control as a focused responsibility in an organization. Heaven knows that it takes its toll of man, money and machines.

It is a job well done. Congratulations.

WILLIAM R. RINELLI
Vice President and
General Manager
Ansul Chemical Company
Marinette, Wisconsin

Engineering education

Dear Sir:

You are to be congratulated for having handled a most difficult topic in excellent fashion. (See "The chemical-engineering-scientist and how he got that way," Aug. CP, p. 25.) I feel that the article presents the pros and cons of the science approach to chemical engineering education in a very lucid and unbiased manner. Well done!

CHARLES M. THATCHER
Chairman
Chemical Engineering
Pratt Institute

OPERATING MANAGEMENT'S OWN MAGAZINE

November 1961

CHEMICAL PROCESSING

Employee benefits ...the fringe thickens

Operating management has an obligation to be aware of the impact of fringe benefits on operating costs, and to convey to employees the fact that these benefits are a part of their income and a definite payment for services rendered

OPERATING management men in the chemical industry, as in most other fields of business, scarcely need to be reminded that the cost of fringe benefits is in a steady upward swing. It is likely to set a new high in 1961.

One authoritative study forecasts the cost of fringe benefits throughout U. S. industry at nearly $42 billion this year. That will be a rise of more than $2 billion over 1960, and an increase of more than $26 billion over the level prevailing just a decade ago.

The chemical and petroleum refining industries are among the most generous in providing workers with a wide range of benefits. The U. S. Chamber of Commerce has estimated the cost of fringes at more than 25% of total payroll in these two fields. Most recent available figures put the cost per worker at about 62 cents per payroll-hour.

It is a discouraging fact, recognized by most employers, that the dollars-and-cents value of fringes is usually overlooked by workers in their consideration of total income. Ask the typical wage-earner his income and he is likely to cite his hourly rate of pay, disregarding entirely the fact that fringes are also a part of his compensation.

The Du Pont Company reports that the total cost of employee benefits in 1960 was $155 million — equivalent to 27% of salaries and wages for time actually worked.

At the consumer level, out of each dollar spent for privately-produced, non-farm goods and services, roughly nine cents goes to cover the expense of providing "fringes" to workers.

Began As A Little Something Extra

The idea of fringes started out as "a little something extra" over and above straight hourly pay. Often it was a gesture of goodwill from management; sometimes, a response to employee demands.

In recent years, such benefits have substantially improved employee well-being, but they also have boosted sharply the cost of doing business. As one expert put it, "When a worker is hired today, or a new wage contract is agreed upon, the wage rates established no longer measure the labor costs. The number of hours actually worked no longer measures the number of hours for which the employer must pay."

Studies show that there appears to be no relationship between the size of a company and the extent of fringe benefits it provides its workers. Some of the country's smaller firms find themselves paying out a higher percentage of payroll cost in fringes than do some of the giants of industry.

Says James M. Black, an industrial relations specialist, "How much a company pays for 'extras' depends upon the nature of the industry, its financial situation, the strength and social philosophy of its union, the region in which it is located, and the competitiveness of the labor market.

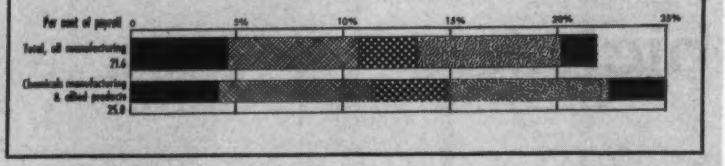
"If you study the vanguard companies in the field — the

Photo, courtesy, Toni Co., Chemical Development Dept.

***A little acorn** of custom that became an established oak in fringe benefits, the coffee break is now part of most wage agreements. In some industry areas, 94% of companies recognize this relaxation period*

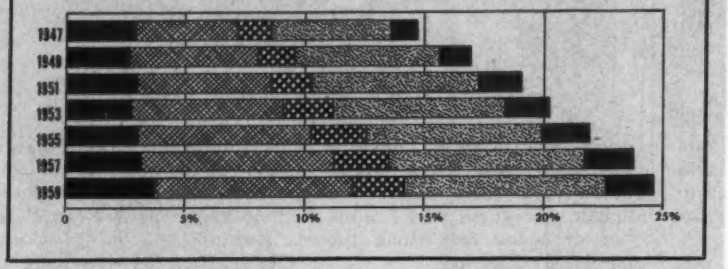
Chemicals and allied products rank well ahead of industry average

Fringe Payments as Percent of Payroll, by Industry Groups, 1064 Companies, 1959



While fringe payments continue to rise from year to year

Fringe Payments for 108 Identical Companies



Legally required payments
Pension and other agreed-upon payments
Paid rest periods, lunch periods, etc.
Payment for time not worked
Profit-sharing payments, bonuses, etc.

Source: Chamber of Commerce of the United States, Washington, D.C.

big ones which feel the first impact of labor's demands — you can judge very accurately which fringes have captured the union leaders' fancy, and estimate just when and to what extent you will have to discuss their theories at your own bargaining table."

Almost half of all fringe benefits currently provided for workers in the U. S. represent payments for vacations, holidays and rest periods. These benefits are included in most wage reports to the Government as a part of employee wages. Benefits such as these in reality give the worker increased pay for each hour he actually spends on the job.

Other normally accepted fringes, such as pensions, social security and insurance benefits, are not part of the payroll and are not mirrored in current income or wages of employees. Nevertheless, they are a substantial cost of doing business.

Beyond these two broad classes of time-honored financial benefits, many employers now are offering their workers a wide range of unusual and unconventional fringes.

Businessmen are finding that it pays to keep alert to developments in the fringe field, because trends in benefits have a way of spreading from one industry to another and from one company to the next.

In the words of one employee relations director, "Frequently, what looks like the capricious whim of today can become the standard feature in many labor agreements in years to come."

Here's where to expect future benefit surges

These are the areas in which industrial relations men say they expect that the big push for additional fringe benefits is likely to come in the future

- Beefed up hospital and medical-care insurance
- More liberal sick-leave arrangements
- Supplemental unemployment benefits
- Shorter work weeks
- Additional holidays
- Funds to cushion the effect of mechanization and automation
- Increased pensions

Fringes To Come Cast Their Shadow

One way to find out what is stirring in the fringe line is to visit a little-known unit in the U. S. Bureau of Labor Statistics in Washington. This unit keeps a record of "new and unusual provisions" in labor contracts. It is an eye-opening experience to leaf through some of the agreements on file in this office and discover the extent of the concessions which management has made to keep industry's work force happy.

For example, a New York fiber processor pays workers up to four hours while they are donating blood. A chemical plant agrees to provide each new employee with four new suits of clothes free, because fumes generated in the plant tend to weaken clothing fibers. Management was persuaded that it had some responsibility for helping combat the high "mortality rate" on garments.

Union Seeks To Have Say in Plant Relocation

Here are some other "special provisions" found in labor agreements:

- A Milwaukee manufacturer's contract lets the union pick one member of the company's board of directors, subject to confirmation by shareholders at the annual meeting.
- Contracts negotiated with various employers by the Machinists' Union provide for such benefits as payment for broken eyeglasses damaged on company time, and the continuance of full pay in the event a worker is quarantined for a contagious disease.
- Agreements in effect in several industries provide that the employer shall not relocate a plant without the consent of the union involved.

The latest thing in fringes appears to be "lonely pay" — added compensation for workers who are deprived of the companionship of their fellows while at work. Contracts covering some workers at nuclear-energy plants provide for such "isolation pay" for workers in certain restricted areas away from others.

What sometimes starts as a modest concession to employees' comfort or well-being can spread into a common and costly custom. As an example, consider the coffee break. A few years ago, only a handful of agreements contained any reference to employees' coffee-drinking habits. Today, according to a survey made of 600 business concerns by one

state manufacturers' association, nine out of ten concerns allow their workers time out for coffee. The average respite is two 15-minute breaks a day. That adds up to 16 full days a year in "relaxing time" during regular working hours.

A new study by a coffee trade association cites figures to show that the coffee-break today is enjoyed by 74-94% of workers in the U. S. and Canada. Dr. Ernest Dichter, president of the Institute for Motivational Research, says that this is not necessarily an indication of wasted time, because "the coffee break can be a potent tool for good employer-employee relations."

Not all fringe benefits, of course, show up as formal contract provisions. In a good many instances, employers have voluntarily offered benefits not requested by unions.

Often it is difficult or impossible to discontinue these benefits once they become accepted customs. For example, a Philadelphia company for 30-odd years had been in the habit of giving its workers a Christmas gift — sometimes a turkey, sometimes a check for $10.

When the recent business recession affected the company's operations and its profits, management decided to skip the Christmas remembrance on the theory that it always had been a "token gift," not a bonus.

Union locals promptly branded the omission a violation of labor contracts. They argued that the annual gift was of such long-standing it was one of the "accepted practices" the labor agreements specified were to be continued in the future. The issue had to be submitted to arbitration.

Companies Overseas Have Same Problem

American employers who are concerned about the rising cost of fringes can take at least a grain of comfort from the fact that such benefits paid by companies in Europe and in Japan are on an even loftier scale than in this country.

In Italy, for instance, employers foot the bill for an additional 75% of wage costs for fringes. Employers in France pay 50% beyond regular earnings. These contributions are made compulsory by various governments, and include family allowances, housing subsidies, health and recreation benefits, free or subsidized meals and free coal.

In the Common Market countries, payment for days not worked ranges from 7% of gross wages in Germany to 14% in Italy. A large number of paid holidays in Italy give workers there more paid leisure than in almost any other country in the world. Meanwhile, competition in fringes is growing stronger in both Germany and France, where the labor market is tight and employers find it essential to lure manpower through various devices.

Basic wage rates in other countries, of course, are well below those of the U. S. so that, even with expensive fringes, labor costs are lower than here. Even so, the trend to "built-in" benefits is a worry to producers overseas.

Do Fringes Help Employee Relations?

Are fringes really important in attracting and holding workers, and in stimulating them to produce to the best of their ability? That question has been debated by economists for a long time, and there are still no reliable statistics to provide an answer. Judging from the many new benefits granted year after year, many companies believe they can build worker morale and gain loyalty.

Some well-regarded labor relations experts, on the other hand, tend to downgrade the value of fringes. What is important to most workers, they assert, is the dollars-and-cents amount the worker takes home for spending, not the intangibles that can rapidly become a built-in cost of staying in business. These advisers recall the dictum of Samuel Gompers, great labor leader, that the greatest crime a company

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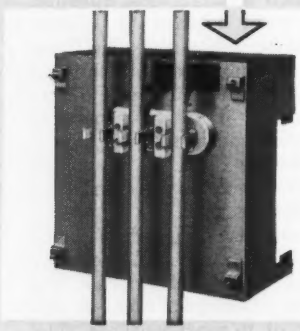

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can commit is to fail to make a profit.

Regardless of the varying points of view, the trend toward more and more fringes is indisputable. There is no sign the pattern will be reversed. This puts continued pressure on management to streamline operations, become more efficient and try to keep costs under control. Unless this happens, the fringes of today and those that are likely to come tomorrow will show up in higher prices for both raw materials and finished goods.

Benefit Story Needs Telling

It is up to operating management to be sure that the importance of these fringe benefits is not overlooked, that everyone realizes that this cost is just as real as the cost of raw materials and equipment. A sound program of telling this story to all employees is important (see CHEMICAL PROCESSING, February 1958, page 41) and should be organized to operate on a continuing basis. In this way, fringe benefits can work as a positive force in getting and keeping good people and maintaining efficient operations. ∎

"It's about as important a project as they can tackle . . . they're figuring out a new route to come to work."

The platinum metals bringing new economies to chemical processing

Platinum-titanium chlorine electrode and air-pollution abatement by catalytic processes highlight the progress being made in finding new ways to use the platinum metals commercially

By CHARLES W. ENGELHARD
Chairman and President
Engelhard Industries, Inc.

THE RECENTLY developed platinum-titanium electrode may be the basis for the greatest advancement in chlorine manufacturing in many years. Based on plant-scale tests with the new electrode, Du Pont reports a significant improvement in chlorine quality, in diaphragm life, and chlorine production, along with considerable savings in power and anode consumption, and increased anode life. Possible savings through use of the electrode loom large.

Use of a platinum-metals catalyst (palladium in this case) to purify nitric acid tail gas has not only prevented air pollution but has resulted in the entire nitrogen requirements for an ammonia plant's being supplied from the purified gas. In the process, the tail gas containing nitrogen oxides and nitrogen is combined with a hydrogen-rich stream. Gaseous mixture is passed over the catalyst where the nitrogen oxides are reduced. After scrubbing and liquefaction-fractionation, the synthesis gas for ammonia process is produced.

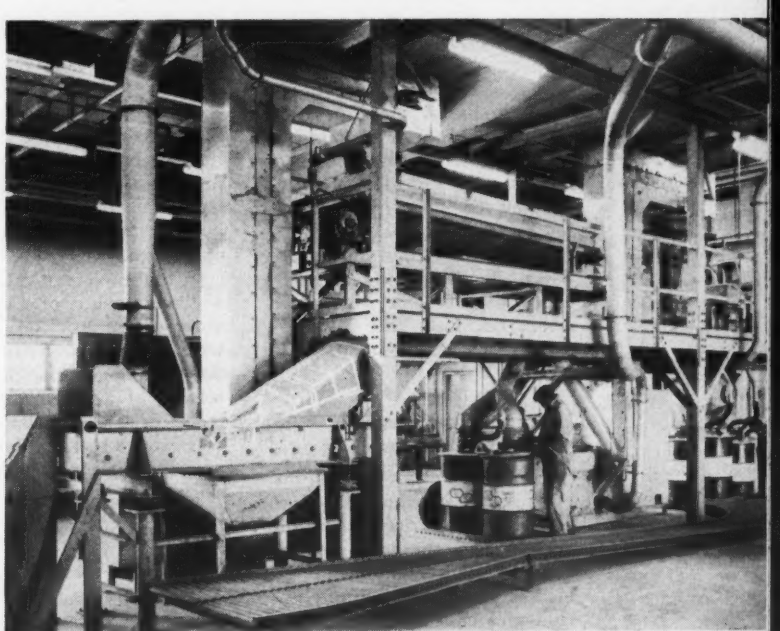
Other notable achievements have been made in air-pollution abatement, chemical synthesis, gas separation, temperature measurement, corrosion control and other areas through the use of platinum, palladium and the other metals associated with them. Many of these are resulting in large monetary savings.

Hence, the six platinum metals — platinum, palladium, rhodium, ruthenium, osmium and iridium — are finding broader uses in chemical processing, principally because of the economies they furnish.

Platinum May Provide Lowest-cost Solution

Because platinum is expensive on a weight basis, some individuals have considered that it might be too costly for certain chemical applications. For example, when platinum was first considered as a catalyst for petroleum refining, researchers had to overcome a mental block, having unconsciously already concluded that use of platinum was out of the question because of its price. Of course, now we know that platinum catalyst has saved many millions of dollars in petroleum refining.

Another factor that is bringing down the cost of using platinum is that ways have been found to use less and less of the metal to obtain the same results. For example, the



***Sifter-sampler** at Engelhard Industries. Here begins the process of determining platinum-metal content of spent catalyst returned for recovery*

Platinum metals bring new economies

User has a selection of petroleum-reforming catalyst now offered in two grades, containing 0.6% and 0.3% platinum, respectively, the remaining percentage being the carrier. For some tasks, the 0.3% grade performs as well as the other one.

Also, platinum is not used up in the majority of processes but is returned to the manufacturer for recovery with only a small portion being lost each time. In this way, platinum is used over and over again.

The research program at our company is designed, among other things, to achieve economies in the use of platinum metals. The recovery process has been continuously improved, permitting material that contains smaller and smaller percentages of precious metals to be treated economically. While a few years ago, the average precious-metals content of material received at the refinery was more than 90%, today the figure is less than 1%. Lean wastes are no longer being discarded, but are being returned for recovery since this now is economically justified.

With chemical operating managers becoming increasingly aware that the platinum metals are not costly, based on performance, they are finding applications in many diverse areas. A more detailed discussion of these applications may suggest how the platinum metals can improve the efficiency of your plant. First, let us discuss the platinum-titanium electrode in more detail since it is truly a significant development which can affect not only the chlorine-caustic industry but others as well.

Platinum-titanium Electrode Versatile

While the platinum-titanium electrode has many possible applications, the most significant use at present is for the electrolytic production of chlorine and caustic soda. In this application, the new electrode is designed to replace graphite, which, in turn, replaced pure platinum gauze decades ago.

Basically, the electrode combines the advantageous electro-chemical properties of platinum with the economy of depositing it in a thin coating on a titanium carrier. Either one or both sides of the titanium base can be coated with platinum varying in weight from three to 70 milligrams per square inch of surface. This is equivalent to a maximum thickness of 250 micro-inches.

The titanium possesses excellent strength and high corrosion resistance for many applications, and is less expensive than platinum. The combination thus permits a smaller quantity of platinum to perform the desired task at lower cost. In processes where, over a long period of time, the platinum is consumed or transferred to the electrolyte, the electrodes can be recoated, resulting in further over-all economies. Nobility of the platinum, coupled with the corrosion resistance of the titanium, also insures high purity of electro-chemically processed products.

While the platinum can be applied to any desired mill form of titanium, there are particular advantages to expanded-mesh and flattened-expanded-mesh electrodes. These are available in addition to sheet and other shapes. Engelhard's mesh electrodes have apertures roughly ⅛" by ¼", and total about 50% open area.

In the expanded-mesh form, a given weight of metal provides more surface area as well as improved electrolyte circulation, and facilitates the release of evolved gases from the electrode. This latter property is especially valuable where horizontal electrodes are required, such as in chlorine-production cells utilizing a pool of mercury as the other electrode.

By flattening the expanded-mesh electrodes, these basic advantages are retained, with the added possibility of closely spacing the electrodes. This capitalizes on the fact that platinized titanium electrodes do not break down physically, which would alter the inter-electrode distance and increase the voltage requirements. As a result, extremely close voltage control is possible, and power requirements can be minimized.

Other major applications of these electrodes now well along in the development stage include a) conversion of sea-water and brackish water by electro-dialysis, b) removal of valuable or harmful particles from industrial process water and c) utilization in base-metal electroplating and electro-metallurgical refining.

Consideration also is being given to a) separation of colloidal suspensions by electrophoresis, which could be applied to the separation of blood fractions; b) metal-particle concentration in ore processing; c) small hypochlorite sterilizers for chlorination of swimming pools and d) direct conversion of chemical energy to electricity in fuel cells.

A long rod-shaped platinum-titanium anode is being offered by Cathodic Protection Service, Houston, Texas, for the more difficult impressed-current applications such as salt-water vessels, heat exchangers, water lines, pump manifolds and process equipment.

Catalytic Applications Are Numerous

First commercial applications of the platinum metals as catalysts were for the production of sulfuric and nitric acids. Now textile intermediates such as nylon X, chemicals, high-octane gasoline and fine pharmaceuticals are all manufactured with the aid of platinum-group catalysts.

While each of the six platinum metals displays some catalytic activity, platinum, palladium, rhodium and ruthenium are the ones used primarily in hydrogenation reactions.

Catalysts are produced for the reduction of aromatic systems, nitro compounds, nitriles, oximes, carboxylic acids, ketones, aldehydes, olefins, acetylenes and polyfunctional molecules.

Platinum and palladium can be used at low temperatures and pressures for the preparation of amines by reductive alkylation and for the hydrogenolysis of benzyl derivatives.

Air Pollution Control Boosts Use

The prospect of increased State and Federal controls over pollution has stimulated the use of platinum-group catalysts for destroying noxious gases. A number of the devices to be used with automobile mufflers employ platinum-group catalysts.

The process mentioned earlier for re-using tail gases in ammonia synthesis is being used on a full-scale commercial basis by Du Pont.

This catalytic process for producing synthesis-quality nitrogen is not a universal solution but rather one which is suited to circumstances in which pollution abatement is required and where natural-gas cost is relatively high. The process may also be attractive where electrolytic or byproduct hydrogen is available.

Because of the complex interrelationships between the nitrogen sources and the reforming methods for producing the hydrogen, it is not possible to make any simple economic statements about this process. It is believed, however, that it will prove attractive in a number of special situations.

The removal of acetylene from gas streams is still another area wherein catalytic processes are employed. Acetylene removal is accomplished by catalytic hydrogenation to the corresponding olefin or paraffin. A wide variety of operating pressures and compositions is amenable to such

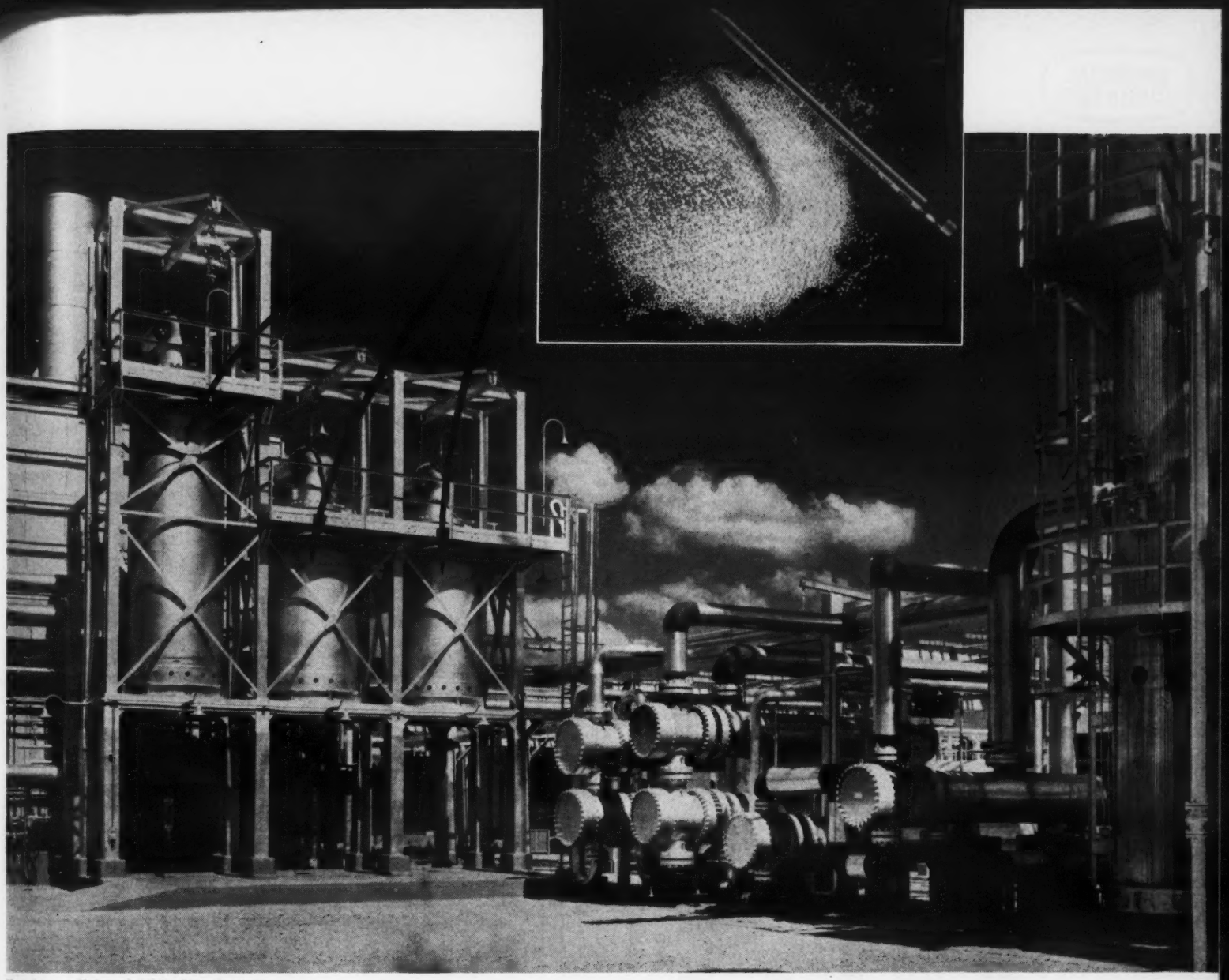


Photo Courtesy Universal Oil Products Company

***Three reactors** in this typical 5000-bbl/day UOP Platform contain platinum catalyst (inset). Greatest portion of the platinum metals used in the CPI is for catalytic application*

treatment, and such processes are now accorded wide acceptance by the chemical processing industries.

Some platinum metals, especially palladium, make excellent catalysts for the hydrogenation of derivatives of tall oil — the mixture of rosin acids, fatty acids and unsaponifiables obtained from sulfate pulping of pine wood. Modern fractionating equipment makes it possible to separate this mixture into distinct groups amenable to further purification and processing. Growth of tall oil as a raw material — from 27 million lb/yr in 1940 to an estimated one billion pounds by 1965 — has been aided by the processing role played by platinum catalysts.

Platinum-metal catalysts are especially useful in upgrading tall oil in three large areas:

- Stabilization of the rosin fraction by catalytic isomerization of abietic acid to a mixture of dehydroabietic acid and tetrahydroabietic acid.
- Reduction of unsaturation in the rosin fraction through catalytic hydrogenation to give a product which is much more stable to oxidation than the starting material.
- A modification of the fatty-acid fraction through partial or complete saturation of olefinic linkages by catalytic hydrogenation.

Gases Purified With Platinum Catalysts

The purification, generation and analysis of gases is still another aspect of the chemical industry in which platinum-metal catalysts are utilized in engineered equipment.

The chemical, pharmaceutical, petroleum and food processing industries are among those that use the Deoxo processes for the catalytic purification, hydrogenation or oxidation of certain gases such as hydrogen, nitrogen, argon, neon, carbon dioxide and saturated hydrocarbons. A Deoxo

To page 54

CHEMICAL BUSINESS

End-point programming technique gives Monsanto a magic touch in batch processing

Scoring a pair of dramatic production boosts of 20% and 25%, a revolutionary batch-process programmer heralds the dawn of a new day for operating management whose processes are not fit to go continuous, but who must step up production to stay alive under the pressure of the "profit squeeze"

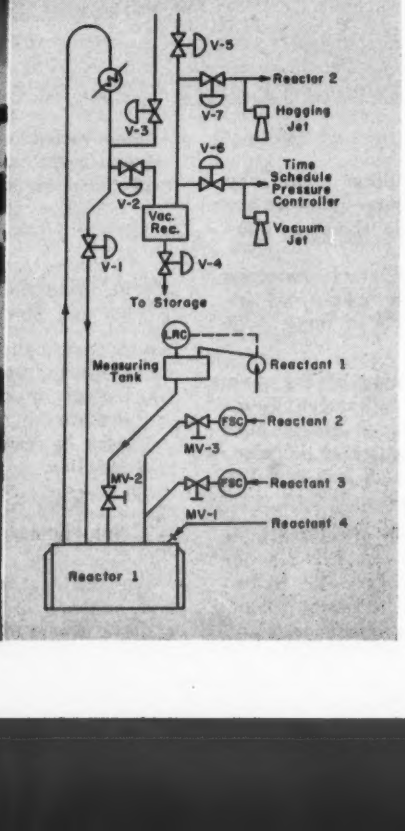
A PAIR of programmers utilizing the end-point principle have raised production rates 20% and 25% on two Monsanto Chemical Company batch processes.

Each of these units is similar to a conventional batch programmer in that it automatically advances the batch through its processing stages. However, movement from one stage to another takes place not according to a rigid time schedule, but only when pre-selected end-point conditions of the first stage have been fulfilled.

At the end point (e.g., a given temperature, pressure and/or elapsed time period), a signal from the process tells the programmer mechanism to advance the batch into the next process stage. This sequence automatically continues until the end point of the last process stage is reached.

Control of batch ester process *at Monsanto is under supervision of end-point programmer, a procedure which has raised production by* 20%

Fig 1 — Batch reactor and Associated Equipment



What does all this mean in terms of process improvement? It means that a batch process so programmed will produce batch after batch of product to virtually the same specifications, since each stage of the process is fulfilled exactly as intended . . . it means that there will be no lost time, since the process is moved from one stage to the next just as soon as the end point of the first is reached . . . it means that a good deal of pressure is removed from the operator, since the guesswork is taken out of his job.

Monsanto's experiences more than back up these conclusions. In 1956, the Queeny Plant Technical Service Department started to design the first programmer. The resulting installation increased production more than 20% and was welcomed by the operators. Financially? It paid for itself within six months and takes less than $200 a year to maintain.

On another process, in the Everett, Mass., plant, a programmer was installed in 1959. The results were similar: Production was increased more than 25%; the payout period was less than six months; and the working force found the programmer to its liking.

To get a better idea of how this new technique works, let us take a closer look at the thinking behind and the steps involved in the first installation above . . . in which a 20% output gain was realized.

The process in question is for the making of an ester. It is considered as start-

A new technological tool for operating management

The programmer described in this article differs from earlier control systems for batch processing in one important respect. In earlier set-ups, the batch was advanced through its stages according to a time schedule. A pre-selected time period was scheduled for each stage.

Because of this schedule, no attempt was made to see that each stage reached the same end point in every batch. With this programmer, the batch is advanced only after the required end point of each process stage is achieved.

End-point programmers for batch processes are sure to register a big impact in the CPI. They provide a relatively economical way to boost production. In their search for greater profits, and because of their inherently high labor costs, many batch processors often consider a shift to continuous operations. Much of the time, however, such thoughts remain only thoughts . . . and for good reason.

In many cases, production is not of sufficient quantity to justify the expense of the more elaborate equipment and instrumentation needed to produce on a continuous basis. Also, there are a number of products which would be difficult, if not impossible, to produce continuously. Many are quite tricky, requiring close operator supervision. Still others involve extremely slow-reactions — far from ideal for continuous processing.

End-point programming, then, offers the batch processor feeling a profit squeeze an alternative to the often-unfeasible prospect of changing to continuous operations.

By **FORREST E. HEAD**
Engineering Specialist
Engineering Department
Organic Chemicals Division
Monsanto Chemical Company
St. Louis, Missouri

ing with an empty reactor and all of the reactants available. As the dibasic organic acid is mixed into the alcohol, the half ester starts forming.

The half-ester formation is completed by refluxing the entire batch for a pre-selected time period. The addition of a third reactant starts forming an intermediate and two byproducts.

The intermediate's formation is forced to completion by distilling off all the byproducts. The fourth reactant is next added to start formation of the ester. This formation is also completed by refluxing the batch for a certain time period.

The excess raw material is then driven off until the reactor pressure and temperature reach the desired end points. Finally, the ester is pumped out of the reactor to make way for the next batch.

The processing equipment for one of the two reactor systems in the process is shown in Fig 1 (on the facing page). The two reactors have a common vacuum system.

Prior to the programmer's development, several automatic-control mechanisms were selected to help keep the operator free to advance the process from one stage to the next at the proper time.

First, an automatic measuring-tank cut-off system was selected to replace a set-up requiring the operator's presence. Motorized valves next were selected to replace all frequently used hand-operated valves. An automatic timer was then installed to indicate when the refluxing period was over.

The conventional vacuum-system pressure controller was next replaced by a time-schedule unit. Finally, the heating jacket on the glass-lined reactor was given a more precise steam-pressure-control system.

All these mechanisms helped to keep the operator available for advancing the process into the next stage. However, they did not insure that the advancement was made at the first possible opportunity. To minimize the delays, the operation of the whole system was put under the control of a sequencing mechanism or programmer.

This programmer consists of a memory circuit associated with a stepping switch that controls physical manipulations of the process equipment. (The memory circuit and other system hardware are explained in more detail in the article beginning on p. 37. In one part of the memory are stored the physical manipulations to be done in each stage. A second part stores the end points of the process stages.

At the start of the batch, the programmer sets up the processing equipment to do the pre-selected chemical operations. The batch responds to these operating conditions until the pre-set end point of the first stage is reached. This end point generates a signal that causes the stepping switch to advance only one step.

By advancing this step, the programmer sets up the process equipment to do the operations pre-selected for the second process stage. This step-signal-step sequence proceeds as programmed until the final process stage is completed.

The designers of the programmer reserved the more complex and/or important operations for the operator. He was made responsible for having the reactants available, for charging them into the reactor, for starting the programmer and for pumping out the product. The remaining physical manipulations were left to the command of the programmer.

The process for making the ester was divided into the following process stages:

Process Stage 0 — Reactor empty and reactants available.

Process Stage 1 — Start making half ester by mixing acid into alcohol.

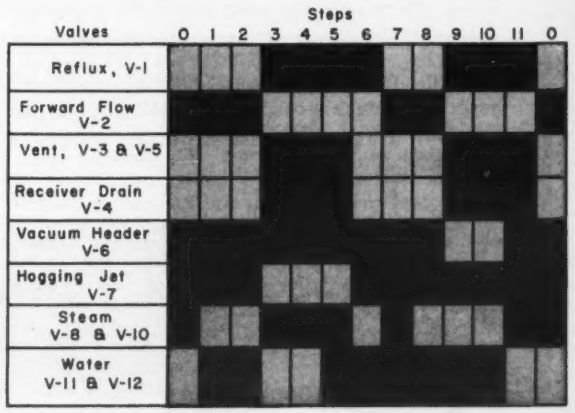
Process Stage 2 — Complete formation of half ester by refluxing.

Process Stage 3 — Cool reaction mass so that third reactant can be added. Intermediate and byproducts start forming.

Process Stage 4 — Force reaction to completion by driving off all byproducts.

Fig 2 — Valve Positions in Each Process Step

(Solid indicates valve closed.)



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END-POINT PROGRAMMING TECHNIQUE —

Process Stage 5 — Add fourth reactant to start forming ester.

Process Stage 6 — Complete reaction by refluxing.

Process Stage 7 — Distill off excess reactants under vacuum.

Process Stage 8 — Cool and vent reactor so that ester can be pumped out.

Process Stage 9 — Pump out reactor.

The steps in the programmer that were needed to do these process stages follow. The signal to start each step is given with the step. In a few cases the programmer needed two or three steps to achieve one process stage. Positions of the valves for each of these steps are shown in Fig 2 (p. 35.)

Process Stage 1:
Opening of valve MV-1 starts **Step 1** so that reactor heats as worker charges it with metered amounts of alcohol and acid.

Process Stage 2:
Closing of valves MV-1 and MV-2 starts **Step 2** so that refluxing is at fastest safe rate. Steam pressure in jacket is controlled at highest safe pressure.

Process Stage 3:
Timing out of reflux period with timer starts **Step 3** so that cooling is at fastest possible rate. All available cooling water is put through jacket.

Reactor-temperature drop to T_1 starts **Step 4** so that operator can add third reactant to reactor.

Reactor-temperature drop to T_2 starts **Step 5** so that cooling of reactor is stopped if addition of reactant is not complete.

Process Stage 4:
Operator pushes button after he has added third reactant to start **Step 6** so that distilling off is at fastest possible rate.

Process Stage 5:
Reactor-temperature rise to T_3 starts **Step 7** so that operator can meter fourth reactant into reactor.

Process Stage 6:
Operator pushes button after he has added fourth reactant to start **Step 8** so that refluxing is at fastest safe rate.

Process Stage 7:
Timing out of reflux period with timer starts **Step 9** so that pressure in reactor can be reduced as programmed on time-schedule controller. Program is selected for fast removal without carry-over.

A reactor-pressure drop to a pre-selected value starts **Step 10** so that reactor is held at desired pressure until temperature end point of this step is reached.

Process Stage 8:
The reactor-temperature rise to T_4, coupled with the same pressure which started **Step 10**, starts **Step 11** so that all possible cooling water is on the jacket and the reactor pressure is raised as scheduled.

Process Stage 9:
Time-schedule controller returns to its starting position to start **Step 0** so that ester can be pumped out and new batch started.

An analysis of the results of this programming shows that the 20% production boost occurred because the programmer 1) starts each step at the earliest opportunity, 2) simultaneously does several physical manipulations, and 3) aids the process supervisor in finding and in using the best processing conditions for each process stage.

The first of these three output-upping programmer functions occurs, for example, each time the programmer advances one step.

The way **Step 2** is started is interesting. It begins as soon as the operator indicates the reactor is correctly charged. This information is first available when he closes the last of the two feed valves. Limit switches on them tell the programmer to advance into **Step 2**. There is no waiting for the operator to remember to push

To page 38

To program or not to program

. . . and if so, how?

Has reading the preceding article (beginning on (p. 34) convinced you that end-point programming has merit for one of your batch processes? If so, here are some valuable tips from author Forrest E. Head on picking the right process, justifying expenses and selecting and adapting the needed hardware

A good batch-process candidate for an end-point programmer should have three characteristics:

1) Production rate is uniquely limited by the operating conditions. (e.g., The operator handles more than one process.)

2) Mechanization of the operator's physical manipulations is possible.

3) Control of these mechanisms can be centralized.

After the extent of the mechanization has been decided upon, a more detailed analysis of the process and the programmer should be made. The process is divided into stages, and the programmer's steps and signals are listed, as shown in the first story (p. 34). Finally, the position of each function during each step is shown as in Fig. 2. (p. 35).

The cost problem may come up at this point with the question, "Won't the mechanization without programming offer a greater return on the investment?" To date, in Monsanto's experience, the answer is "No." The additional cost of the programming mechanism has been less than 20% of the cost of the mechanisms being programmed.

With the programmer, the total production gain is greater in proportion to capital expense than is the sum of the individual gains due to each mechanism..

The programmer mechanism consists of a memory circuit associated with a stepping device. One part of the stepping device is a rotary switch with 24 steps on it. This switch advances only one step when its motor receives a signal. The second part of this stepping device is a shaft that is mechanically connected to the rotary switch.

On this shaft are a number of wheels or cam holders that are the mechanism's memory. One wheel on the shaft is the memory section for the end points. During each step this wheel connects the rotary switch's advancing motor with the signal source for that step.

The remaining wheels on the shaft are the programmer's memory section for the physical manipulations. There is a wheel for each function. The program for each is stored on its wheel by the placement of cams. Through the switch, the cams command the function during each step.

The commands are either to remain unchanged, to open and remain open, to close and remain closed, to open momentarily or to close momentarily. Thus, by the placement of cams on the wheels, the entire program of all the physical manipulations is stored.

The end-point detectors are always electrical contacts actuated by a measurement. The contact can be actuated by any process variable that can be measured. For the more common ones, complete units are available such as temperature, pressure, level and flow switches.

The less-common measurements are frequently recorded or indicated on electronically balanced instruments equipped with cam-operated switches.

Sometimes the sensitivity and reproductibility of standard industrial switches are inadequate for detecting process end points. One solution is to make the measurement with an electronically balanced instrument that has the needed performance specifications. Such an instrument is then equipped with a cam-operated switch which can be set very precisely.

Fig 3 shows several arrangements of the measurement contacts used for end-point detection. The closing of these contacts advances the stepping switch.

The simplest arrangement is the measurement of one variable, as shown in line 1. When the measurement reaches a pre-set value, contact C1 closes. Upon this closure, the arm on the stepping device advances one step to line 2. The remaining arrangements are for more complex end-point requirements.

On line 2, an end-point requirement involving several measurements is shown. The two contacts, C2 and C3, must both be closed to advance the arm to line 3. This type of circuit can be extended to any number of contacts in series. All of the contacts must be closed before the arm will advance.

On line 3 is shown another type of end-point requirement using several measurements. Here, the arm will advance if either C4 or C5 are closed. This circuit can be extended to any number of contacts in parallel. The arm advances to line 4 when any one of the contacts closes.

A circuit that uses both measurement-actuated contacts and a function switch is shown on lines 4 and 5.

The purpose of the entire circuit is to ignore the low-flow contact when flow is being started, to sound an alarm if flow does not start within a pre-set time period and to honor the closing of the same contact later in the step.

At that time a low flow is the signal to advance. The contact is a flow switch that cannot respond as soon as the flow valve opens. There is almost no limit to the circuits available for unusual end-point requirements.

In building a programmer, one is always wise to provide means for manual operation of the functions. This feature is especially valuable during the start-up period, the training period for the plant personnel and any partial failure of the utilities. ■

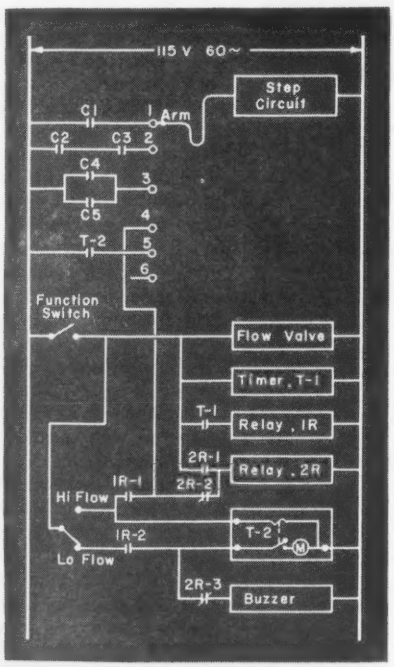


Fig. 3 — End-point Circuitry

Batch Processing

From page 36

a button.

Another example of the same function is the starting of **Step 11.** The starting signal is a preselected temperature and pressure in the reactor. As soon as these occur, temperature and pressure switches close. This signals the programmer to advance. Here again, there is no waiting period for the operator to detect the reactor's condition and to take the necessary action.

A second basic programmer function is to do several things simultaneously that formerly were done one at a time. Most steps in the programmer are examples of this.

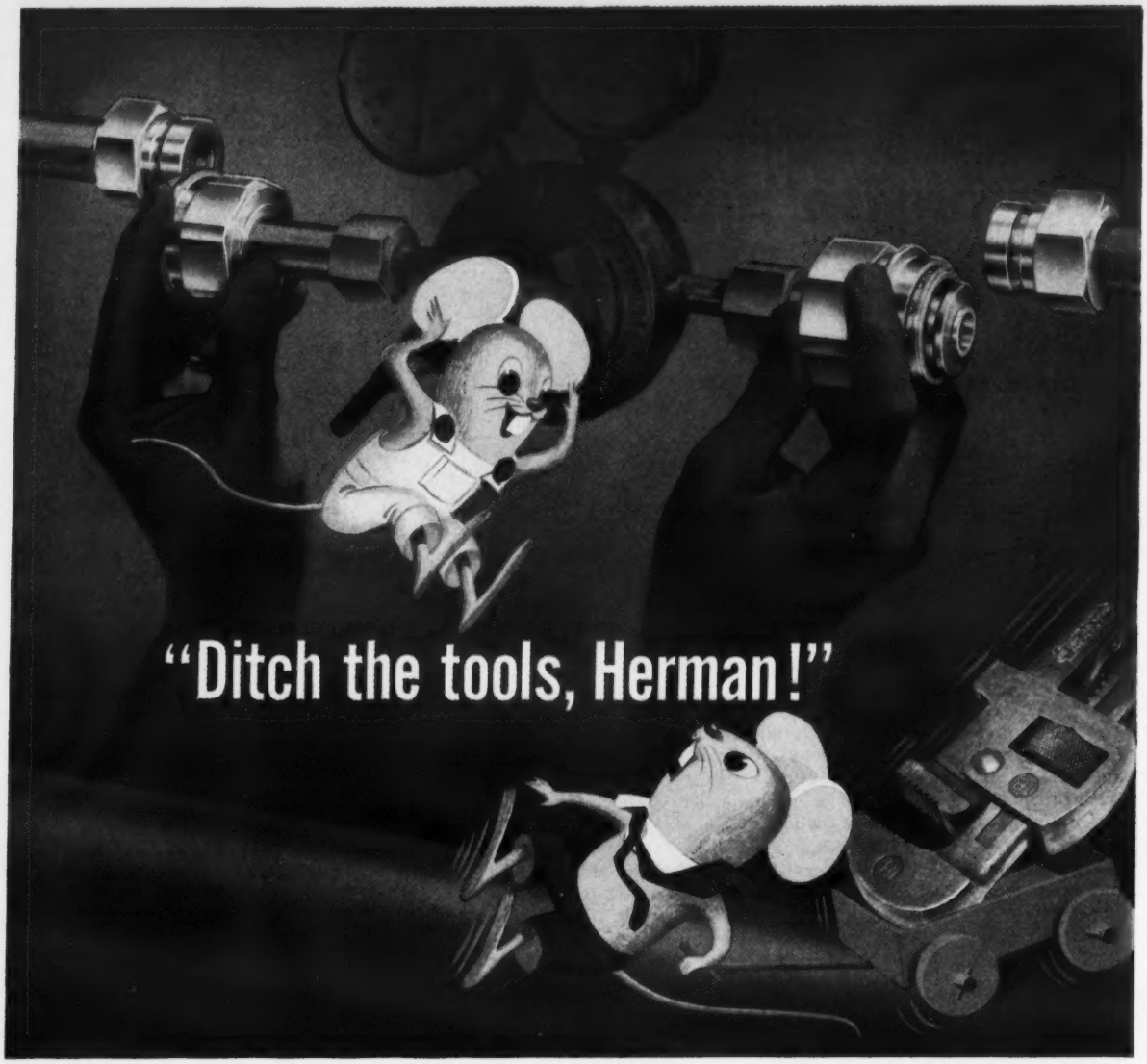
Step 1 is a simple but slightly unusual illustration. To start **Step 1,** the operator opens the alcohol feed valve. A limit switch on the valve signals the programmer to start heating the reactor. The operator's action to start charging the reactor also starts heating it.

Another case in point is in advancing into **Step 3,** where seven valves in widely separated process lines must be repositioned.

The third main programmer efficiency contribution is finding the best operating conditions for each process stage. For example, in **Step 2** the batch is kept on total reflux for about 15 minutes. Could the period be shorter? Should it be longer? With hand operation the reflux period varies ±50%. With the programmer the reflux period is preselected each time. This permits experimentation under controlled conditions to find the optimum reflux period.

Final Increase Greater

As a result of this programmer function, the final production increase was greater than the initial increase. The time cycle for the first few batches processed with the programmer was about 10% better than the best with hand operation. The remaining 10% was gained because the programmer helped to find better operating conditions for each stage. ■



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Check 1629 opposite last page.

Two boosts for use-potential of epoxy resins

Curing agent and viscosity modifier, each in easy-to-handle liquid form, improve properties of formulations for wide range of applications

INCREASING use of epoxy resins is due largely to the broad application pattern made possible by modification of the base resin. Selected additives (such as viscosity modifiers) and curing agents may be employed to impart a wide range of desirable chemical and physical properties to the cured system.

Two recently introduced liquid epoxy chemicals — a curing agent and viscosity modifier — have properties that should rapidly catch the eye of epoxy-resin formulators. They are compatible with solid epoxy resins, miscible with liquid resins at room temperature, and yield free-flowing potting, casting and coating compositions of good pot life.

Concentration and formulation ratios are reported to be less critical when these chemicals are used to achieve optimum properties in the epoxy resin system. The formulator may select from various curing cycles, without sacrificing performance of the cured resin. Liquid form simplifies handling and measuring.

The curing agent (Beta-S) is a dimethyl substituted butenyl-tetrahydrophthalic anhydride. It may be used as a curing agent for coatings, laminations, castings, potting and encapsulation.

A typical sample has a freezing point of −10°C, boiling range of 141-151°C (over 85%) at 3-4 mm, acid number of 451 mg KOH/gm and specific gravity (25/25) of 1.081. It is miscible with such solvents as methyl ethyl ketone, toluene, isopropanol and petroleum ether.

The viscosity modifier (Terpox) is a difunctional oxy derivative of a terpene. This material is useful in coatings, laminations, castings, pottings, encapsulations and adhesives.

It has a density of 0.956 (15.5/4), refractive index of 1.478 (n20/D) and freezing point of approximately 14°C. Eighty percent is distillable over 64-100°C, at 5 mm.

Here's A Typical Cure

When Beta-S is used to carry out the curing reaction with a liquid epoxy resin, the anhydride is stirred into the epoxy at room temperature, one percent of a tertiary amine (on wt of epoxy) being added as accelerator, to provide an easily-handled, heat-curing resin system of good pot life.

With a typical bisphenol-

FIGURE 1

Performance of Terpox in Anhydride-cured Systems

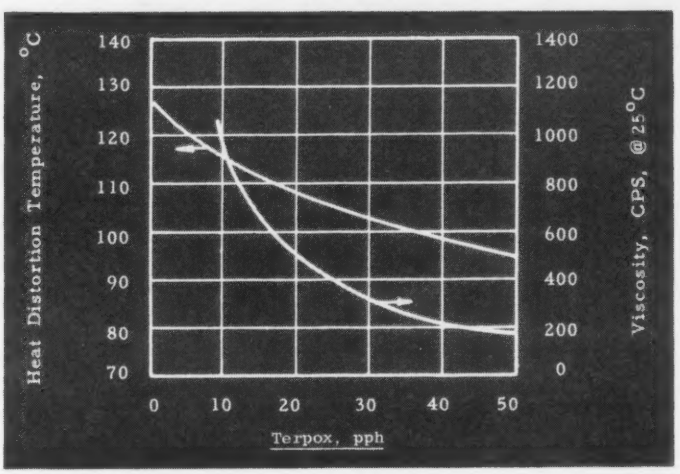


TABLE 1

Typical Properties of Beta-S-cured Epoxy Resin*

Heat-distortion temperature, °C (ASTM D648)	123
Compressive strength, psi (ASTM D695)	15,700
Compressive modulus, psi x 10^6 (ASTM D695)	3.8
Flexural strength, psi (ASTM D790)	12,000
Flexural modulus, psi x 10^5 (ASTM D790)	4.6
Impact strength, Izod, ft-lb/in of notch (ASTM D256)	2.87
Dielectric constant, 60 cycles (ASTM D150)	3.09
Power factor, 60 cycles (ASTM D150)	0.00175
Density, gm/cc, 20°C	1.12
Shrinkage during cure, %	Less than 2

*Cured 16 hours at 120°F, plus one hour at 180°C.

TABLE 2

Formulations for Anhydride Curing

Parts Terpox	Parts Epoxy Resin	Parts Beta-S	HDT, °C	Wt Loss on Cure, %
0	100	119	123	negligible
10	100	133	116	0.81
20	100	147	109	0.85
50	100	189	94	1.15

TABLE 3

Viscosity Reduction in Amine-cured Systems

Epoxy (epoxide equivalent = 200), parts	100	100	100	100
Terpox, parts/hundred (pph)	0	10	10	20
DETA, pph	10	10	15	15
Viscosity, cps at 25°C	2000	760	500	435

TABLE 4

Heat-distortion Temperatures in Amine-cured Systems

Epoxy (epoxide equivalent = 200), parts	100	100	100	100
Terpox, pph	0	10	20	50
DETA, pph	15	15	15	15
Heat-distortion temperature, °C	120	90	61	approaches flexibility

epichlorohydrin-derived liquid epoxy resin of epoxide equivalent about 200, the following formulation is suggested:

Epoxy Resin	100 pt by wt
Beta-S	119 pt by wt
Benzyldimethylamine	1 pt by wt

Without the amine accelerator, the epoxy-anhydride mixture remains usable after several weeks' storage at room temperature. With the accelerator, the mix requires 154 hours at 25° to gel (one-oz container, length equal to diameter). Initial viscosity is YZ Gardner-Holt. Data shown in Table 1 reveals results obtained in curing after 16 hours at 120°C, plus one hour at 180°C.

Terpox Permits Low Working Viscosities

Systems incorporated Terpox can be formulated to very low working viscosities. Yet, due to the reactive character of the material, these systems are curable to resins of good physical characteristics.

Terpox is a low-viscosity liquid, readily miscible with epoxy resins at room temperature. Thus, the advantages of better penetration and wetting ability and increased filler loading are made readily available for the applications cited earlier.

Anhydride-cured Systems

Anhydride-cured epoxies made with Terpox modifier exhibit little loss of weight during heat-curing cycles, and involve a minimum sacrifice of heat-distortion performance.

As illustrated in Fig 1, the sharp reduction in viscosity is in contract to the more gradual change in heat-distortion temperature.

Terpox reacts with the curing agent in a manner similar to the epoxy resin. It is recommended that the formulation include 0.55 mol of anhydride per 100 gm of Terpox in addition to the anhydride normally included for curing the epoxy resin. The modifier should be blended with the epoxy resin prior to incorporation of the curing agent.

The formulations shown in Table 2 were employed to obtain data shown in Fig 1. A bisphenol-epichlorohydrin resin of epoxide equivalent about 200 was used, one part of benzyldimethylamine per hundred parts of epoxy resin being included as accelerator. Cure cycle was 16 hours at 120°C, plus one hour at 180°C.

Amine-cured Systems

Terpox is also applicable to amine-cured systems with diethylene triamine; for example, a relatively small quantity of Terpox provides very fluid systems for cases where heat-distortion requirements are not paramount, as shown by data in Tables 3 and 4.

The cure cycle for data in Table 4 was an overnight (16 hours) cure at room temperature, followed by one hour at 150°C. Weight losses during this cure were less than 1%. Approximately the same heat-distortion temperatures were obtained by replacing the 150°C post-cure with an additional 80 hours at room temperature.

Other Beta-S Uses Loom

Aside from epoxy-resin curing agent applications, Beta-S has a number of other potential uses.

Its sulfonated esters, amides and imides should be of interest in the surfactant field. Its metal salts could function as driers for alkyds, varnishes and oils. Preparation of lubricant additives, corrosion inhibitors, dyes, fungicides and inks are other possibilities.

Its broad use pattern is reflected in the following reactions:

Hydrolysis — Reacts readily with water to form the corresponding dicarboxylic acid.

Esterification — Forms half esters and diesters in reaction with monohydric alcohols. Polyhydric alcohols react with Beta-S to give polyesters.

Amidation — Various N-substituted monoamides can be prepared from the material and an amine.

Imide Formulation — The imide of Beta-S can be obtained by reaction with ammonium carbonate in acetic acid solution.

Reduction — Can be hydrogenated over Adams platinum catalyst or Raney nickel catalyst to yield the corresponding butyl dimethyl substituted hexahydro-phthalic anhydride or acid.

Aromatization — Can be aromatized with ease, using either palladium on charcoal as catalyst, or sulfur. Only one mole of hydrogen is split; the other reduces the side-chain unsaturation.

Oxidation — Aromatized Beta-S can be oxidized with nitric acid to yield a pentacarboxylic acid.

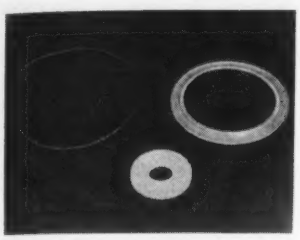
(Beta-S and Terpox are products of Heyden Chemical Division, Heyden Newport Chemical Corp., 342 Madison Ave., New York 17, N. Y.)

Check 1630 opposite last page.

Exacting control possible processing fluorocarbon gives parts uniformity

Uses: Resin can be used to fabricate valve seats, stems and diaphragms, O-rings, gaskets, and electric and electronic components.

Features: Sharper melt temperature, less resistance to flow and a greater hot melt strength permits an exacting control in processing that results in a more uniform, higher quality of parts. Resin remains flexible and tough even



Typical forms of fluorocarbon illustrate varying degrees of transparency that may be induced by processing methods

at liquid oxygen and liquid hydrogen temperatures. Thermal stability range is from −400 to +400°F.

Description: Fluorocarbon is is formed by homopolyemerization of chlorotrifluoroethylene and contains more than 60% fluorine by weight. Varying degrees of transparency may be induced by processing methods. Product exhibits chemical resistance expected of fluorocarbons and zero moisture absorption.

Resin is offered in two grades, based on molecular weight. Each grade is offered in a variety of pelletized, unpelletized and plasticized forms.

(Kel-F 81 plastic is a product of Minnesota Mining and Manufacturing Company, 900 Bush Avenue, St. Paul 6, Minnesota.)

Check 1631 opposite last page.

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METHYLAMINES

Check 1633 opposite last page.

Thixotropic action widens use areas for epoxy cement

Uses: Cement can be used to bond steel, iron and aluminum. It adheres well to glass (not Pyrex), concrete, porcelain, ceramic, wood and thermosetting resins. If proper surface preparation is stressed, cement will bond to brass, copper, lead and low-nickel stainless steels.

Features: Compound is a soft gel, permitting easy application in thin film. Yet it adheres to vertical surfaces without sagging in films up to 10-mils in thickness.

Description: Unfilled two-part epoxy adhesive is an amber material that hardens at room temperature following a one-to-one mix by volume. This standard mixing ratio emphasizes properties of shear and flexural adhesion. If mix ratio is increased to two-to-one, a high heat distortion resistant, flexibilized epoxy cement is achieved without significant loss of other properties. Heat distortion point of resin made from this mixture is 217°F.

Hardening is at room temperature although rate of hardening can be greatly accelerated under gentle heat. Room temperature cure (75°F) develops good properties within 24 hrs.

(Sonite EA-40 epoxy adhesive is a product of The Smooth-On Manufacturing Company, 570 Communipaw Avenue, Jersey City 4, New Jersey.)

Check 1634 opposite last page.

Ease of mixing and flow found in rigid polyether foam systems

Two recent additions to manufacturer's line of foam resins feature low, approximately equal viscosities for both components. Mixing and flow are easier and no heat is required for curing.

One foam system (4015) is rated non-burning when tested according to ASTM D-1692-59T. The other (4020) has a

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A name to remember. Celanese trioxane stands alone. It's the only source of anhydrous formaldehyde—which you'll recognize as an intermediate of value in organic synthesis. And trioxane, by itself, is a stable, low-melting solid with strong solvent power. Just one example of its usefulness: Phenol-formaldehyde films formed with trioxane as the solvent are hard in the intermediate stage, before curing—whereas conventional liquid solvents produce a softer film. Yes, trioxane is a chemical you might well investigate.

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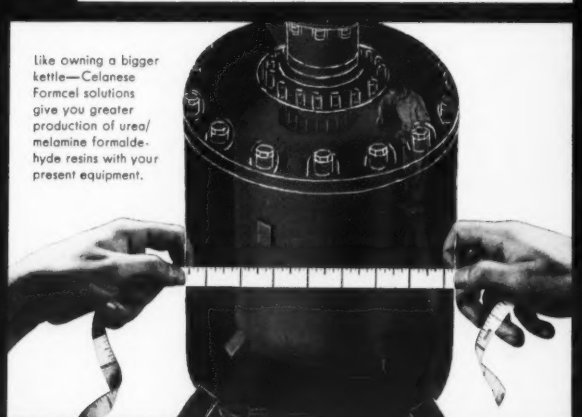

Like owning a bigger kettle—Celanese Formcel solutions give you greater production of urea/melamine formaldehyde resins with your present equipment.

For more information on any or all of the four forms of formaldehyde, mail the coupon on the reverse side of this page.

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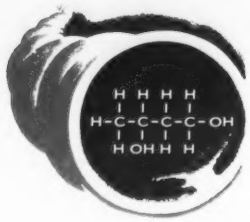

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"built-in" delay before foaming begins to provide extended handling time and permit liquid to flow evenly across mold cavities. K factor of foam produced with either system is 0.11-0.13 Btu/hr/sq ft/°F/in.

(Pleogen polyether foam systems are product of Mol-Rez Division of American Petrochemical Corp., 3134 California Street N.E., Minneapolis 18, Minnesota.)

Check 1635 opposite last page.

Fire resistance added to benzoyl peroxide non-separating paste

Even consistency assures accurate measurement

Uses: Product is primarily employed as a polymerization catalyst for monomeric vinyl, styrene and polyester resins and copolymers of these resins wherever the presence of an ester type plasticizer is favorable.

Features: Improved formulation of benzoyl peroxide paste is fire resistant, ignition point is 240°F. It has an even consistency which assures accurate measurement and is completely homogeneous to give a uniform concentration in each application.

Description: Benzoyl peroxide paste, labeled BZQ 50, is non-separating. Fine particle size provides rapid and complete solubility in esters and other monomers and polymers. Paste will not discolor regardless of age or storage conditions, according to the manufacturer. It can be used in conjunction with other pregelling organic peroxides such as MEK peroxide, cyclohexanone peroxide and cumene hydroperoxide.

(BZQ 50 benzoyl peroxide paste is a product of U.S. Peroxygen Corporation, 850 Morton Ave., Richmond, Calif.)

Check 1636 opposite last page.

For more information on product at left, specify 1637 . . . see information request blank opposite last page.

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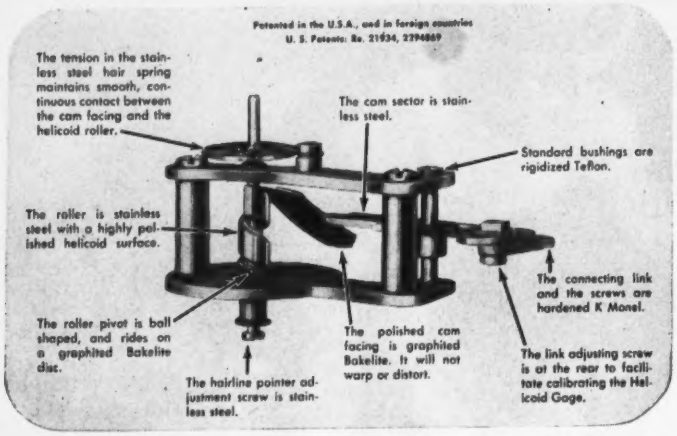
Please send condensed Catalog of Partlow temperature controls and allied equipment for industrial heating and refrigeration.

Name and Title .....
Company .....
Address .....
City and State .....
.....

Check 1638 opposite last page.


Patented in the U.S.A., and in foreign countries
U. S. Patents: Re. 21934, 2294869
The tension in the stainless steel hair spring maintains smooth, continuous contact between the cam facing and the helicoid roller.
The cam sector is stainless steel.
Standard bushings are rigidized Teflon.
The roller is stainless steel with a highly polished helicoid surface.
The connecting link and the screws are hardened K Monel.
The roller pivot is ball shaped, and rides on a graphited Bakelite disc.
The polished cam facing is graphited Bakelite. It will not warp or distort.
The link adjusting screw is at the rear to facilitate calibrating the Helicoid Gage.
The hairline pointer adjustment screw is stainless steel.

Exclusive Helicoid movement provides... *Sustained Accuracy... on the toughest jobs*

• Helicoid Gages have no gears, no teeth, reducing wear to an absolute minimum. No danger of fouling, either—rolling action of cam facing keeps contact surface clean. Helicoid Gages have been tested through 75,000,000 cycles, with virtually no wear or loss of accuracy, while conventional geared gages became useless after 500,000 cycles.

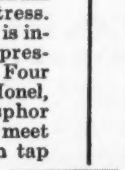
Helicoid Gages give *sustained* accuracy even when subjected to violent pressure pulsations or mechanical vibrations. Pointer can be set externally, without removing glass, and cannot be jarred out of position. Dial faces are easy to read, won't corrode or chip. A full range of Helicoid Gages is available for any application. Next time, specify Helicoid—the gage that *stays* accurate.

Bourdon Tubes won't Stretch, Leak, or Crack

Helicoid Bourdon tubes are made from seamless tubing, and are designed for maximum torque and minimum stress. At the factory, each tube is individually tested, overpressured, and stress relieved. Four materials—alloy steel, K Monel, stainless steel, and phosphor bronze—are available to meet applications ranging from tap water to almost any acid.

NEW! Solid-Front Safety Case Gives Added Protection

The new Helicoid solid-front case diverts the force of a burst in a backward direction, away from the operator. The force escapes by deforming, though not detaching, the back cover plate. Helicoid Gages are also available in phenol, acaloy flanged, acaloy flangeless, polished flangeless, round flush, polished flush ring, and square flush cases.



WRITE for details **Ask for Catalog DH-65**

HELICOID GAGES

Helicoid Gage Division • American Chain & Cable Company, Inc.
929-P Connecticut Ave., Bridgeport 2, Conn.

Check 1639 opposite last page.

Simple one-to-one mixing by weight or volume marks casting epoxy

Cured resin takes 500°F for extended periods

Uses: Product is designed for applications in casting and impregnating. It is reported to be ideal for use in vacuum impregnating operations and laminating applications.

Features: In addition to excellent physical and electrical properties usually associated with epoxy resins, material has a non-critical mixing ratio. One part activator is mixed with one part base by either weight (preferred) or volume. Properly cured resin can be operated for extended periods at 500°F with a minimum loss of physical characteristics. System has a working life of at least four weeks.

Description: Two-part epoxy, Mereco 43-21, has a mixed viscosity of 1090 cps. Cure schedules range from one to two hrs at 150°C for general purpose use to 10 hrs at 60°C plus four hrs at 125°C to insure strain-free results in massive castings. A post-curing or annealing operation is recommended to provide maximum properties.

(Mereco 43-21 epoxy resin is a product of Mereco Products Division, Metachem Resins Corporation, 530 Wellington Avenue, Cranston 10, Rhode Island.)

Check 1640 opposite last page.

Salt form now available of 5-hydroxytryptamine

A water soluble salt form of 5-hydroxytryptamine (Serotonin Hydrogen Oxalate) is now available in research quantities. Compound is supplied as white needles with a melting point of 197-199°C. Product is free of "external" nitrogen and contains 66% active ingredient.

(Serotonin Hydrogen Oxalate is a product of Regis Chemical Company, 1219 N. Wells St., Chicago 10, Ill.)

Check 1641 opposite last page.

It's sticky, stretches, it's amorphous polypropylene

Uses: Preliminary evaluations of this material have shown it to be of promise in hot-melt adhesive blends for laminating and sealing and in caulking and potting compounds.

Features: Product is sticky, stretches and is easily melted. It is compatible with a number of other resins and most waxes and soluble in most aromatic and aliphatic solvents.

Compatibility of amorphous polypropylene permits wide variety of novel blends

Description: Defined as amorphous polypropylene of low molecular weight, product is currently available in two grades; one, a tacky elastomer; the other similar to moderately heavy grease.

Typical Properties

Softening Point, °C (Ring and Ball)	105	75
Density	.82	.79
Color Liquid (Gardner Scale)	1	10
Acid Number	0.1	0.1
Molecular Weight	12,000	6,000
Viscosity, cp (Brookfield)		
120°C		3,000
130°C	200,000	2,000
140°C	140,000	1,400
150°C	100,000	1,000
160°C	70,000	700

(Amorphous polypropylene is a product of Eastman Chemical Products, Inc., Subs. of Eastman Kodak Company, 260 Madison Ave., New York 17, N.Y.)

Check 1642 opposite last page.

THAT'S INTERESTING

Ultrasonic hazard?

Soviet researchers report that ultrasonic waves, such as are being used increasingly in industry can be harmful to workers exposed to them.

Combination of waves of inaudible and audible sound, especially, can cause fatigue, irritability, headache, moderate loss of weight, decreased work output and lowered blood pressure, the scientists concluded. They also cited cases in which ultrasonic waves caused death of laboratory animals.

Propetology makes bow

One specialist you may wish to consult in the future could be the "propetologist."

He'll tell you how susceptible or resistant you are to certain diseases, primarily those of a noninfective nature.

According to Texas U. scientists the tools are now available for founding the new science. All that is needed is to develop their use.

Fourteen years ago Morton Salt stopped worrying about hydraulic oil performance

Harlen Bufka, assistant mill foreman (center) and American Oil's Norm Pagels, review specifications of AMERICAN Industrial Oil. Oil has been used for 14 years in hydraulic press that forms salt blocks under 800-850 tons pressure.

by N. M. PAGELS
About the Author

For 17 years "Norm" Pagels has been providing industrial customers with technical assistance on lubrication problems. His qualifications for this assignment include a degree in chemistry from the Central Michigan University and the completion of his company's Sales Engineering School.

☆ ☆ ☆

Back in 1946, Morton Salt Company installed a 1,000 ton press for forming salt blocks in their Manistee, Michigan, plant. They ran the press briefly with a break-in oil as the hydraulic medium. In 1947, they added our industrial oil to the reservoir. Worries stopped then.

There has never been a complete oil change. Only make-up oil has been added to the reservoir since the initial fill. There has never been any hydraulic pump trouble or a failure of any kind due to the oil. Annually, we take a sample of the oil for analysis by our Technical Service laboratory (at our expense). The oil continues in excellent condition. Morton Salt plant management reports that it (1) holds viscosity (2) resists oxidation (3) lubricates effectively, minimizing wear (4) exhibits excellent demulsibility and (5) is notably resistant to foaming.

☆ ☆ ☆

Would you like to have the trouble-free performance from an oil that AMERICAN® Industrial Oil provides? Call your nearby American Oil office.

Quick facts about
AMERICAN® Industrial Oil

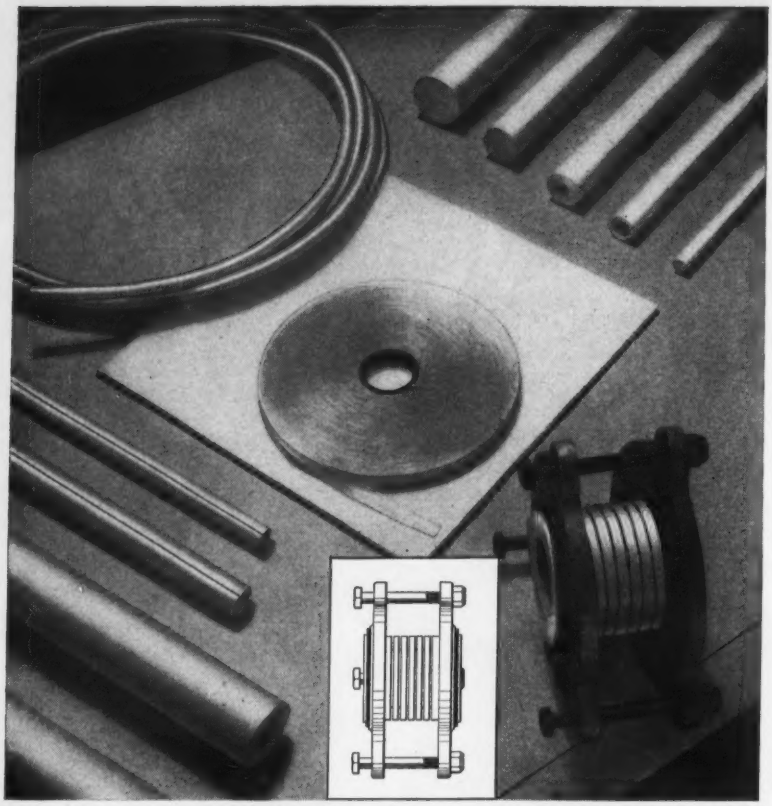
- Antioxidant gives oil resistance to chemical change, minimizes deposits.
- Inhibitor "plates out" on metal surfaces, prevents corrosion.
- Receives special refining to minimize emulsion problems. Contains additive to minimize foaming.
- High viscosity index. Resists temperature change.

AMERICAN OIL COMPANY

AMERICAN

910 SOUTH MICHIGAN AVENUE
CHICAGO 80, ILLINOIS

Check 1643 opposite last page.



For resistance to practically everything, specify R/M "Teflon" gasketing and other parts. The complete R/M "Teflon" line includes expansion joints (lower right corner of this illustration), color-coded thin-wall tubing, bondable "Teflon" sheets, etc.

If the spec reads TEFLON,* get the experience of R/M

No need to restate the unique combination of properties that sets "Teflon" apart. You *know* that for certain process-equipment parts nothing else will do.

But *where to get "Teflon" fast* and *who can best meet your specs?*

On both counts, the answer is R/M. A pioneer in the processing of "Teflon" into sheets, rods, tubes, hose, tape and complete machined parts, R/M offers you a *complete "Teflon" service* — a service that can help assure you smooth, long-lasting performance of severely exposed equipment parts.

It will pay you to talk "Teflon" with R/M. Call your nearest R/M district office (listed below) or write Plastic Products Division, Raybestos-Manhattan, Inc., Manheim, Pa.

*Registered trademark for Du Pont fluorocarbon resin

R/M

PLASTIC PRODUCTS DIVISION
RAYBESTOS-MANHATTAN, INC.
Manheim, Pa.

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SPECIALISTS IN ASBESTOS, RUBBER, ENGINEERED PLASTICS, SINTERED METAL

"See our exhibit at the Chem Show"

Check 1644 opposite last page.

Polymeric plasticizer features low odor and light color

Uses: Primary plasticizer is recommended for use in polyvinyl chloride for such applications as gaskets, sheeting and foam.

Features: Treated by a deodorization technique, product features exceptionally light color, low odor, is completely compatible with polyvinyl chloride.

Description: Product of a dibasic acid and a glycol, true primary polymeric plasticizer has excellent electrical properties. A medium weight (molecular weight 3500) plasticizer, it maintains high dielectric properties even under severe conditions.

(Polymeric plasticizer W-64 is a product of Wilson Martin, Div. of Wilson & Company, Inc., Snyder Ave. & Swanson St., Philadelphia 48, Pa.)

Check 1645 opposite last page.

Acylated sarcosine line has lauroyl sarcosinate as first member

Uses: Product can be used as a corrosion inhibitor, pharmaceutical and cosmetic intermediate, and a modifying agent in polymerization reactions.

Features: Compound shows advantages of soap such as emolliency, detergency, low toxicity but avoids soap's major disadvantage of hard water scum formation. It has powerful corrosion inhibiting action and solubility in highly alkaline systems.

Description: Sodium lauroyl sarcosinate is first of an entire family of acylated sarcosine derivatives to be offered. Supplied in a 30% aqueous solution as Maprosyl 30, product is a colorless liquid with a pH of 8.0 (10% solution). Maximum detergency is shown in the neutral and slightly acid range. It boosts detergent action of alkali and alkaline builders.

In emulsion polymerization, product has a dramatic effect

CESCO
DUMPERS

for lifting and dumping drums, bags, skid boxes, boxes, barrels and trucks

- Handles powders, granulars, stampings, castings, ceramics scrap, sugar, fruits and liquids of heavy viscosity
- Operates at lifting heights from 12" to 50'
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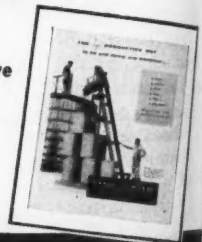
- Benefits — manual labor reduced, easy loading, speedy dumping, and reduced job accidents
- Empties into mixers, tanks, tumblers, chutes, conveyors, hoppers

Write for comprehensive six page dumper bulletin



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DIVISION OF MERCURY INDUSTRIES, INC.
P. O. BOX 111, HILLSDALE, NEW JERSEY

COLSON EQUIPMENT & SUPPLY CO.
1317 Willow Street, Los Angeles 13, Calif.

Check 1646 opposite last page.

of controlling particle size, polymerization rate and stability of the polymer emulsion. Concentration used was 1% of the weight of the monomer, in combination with primary emulsifier.

Maprosyl 30 is neither a primary irritant nor sensitizing agent when tested as a 10% active solution on albino rabbits and on a group of human subjects. When administered to rats in single oral doses the LD50 is about 5000 mg/kg.

(Maprosyl 30 is a product of Onyx Chemical Corporation, 190 Warren St., Jersey City 2, N.Y.)

Check 1647 opposite last page.

Service life of coating in salt water and sun doubled by urethane

One-can urethane coating used on wood has been in service for more than two years in a sun and salt water exposure that finished conventional spar varnishes in six months. Urethane coatings can be sprayed or brushed on to give bubble-free and crater-free films with high surface adhesion. Varnish dried in two to four hours, permitting two coats to be applied in one day.

Block adduct resin used for coating is a 70% solids material in mineral spirits. Formulator needed to add only solvent and metal catalysts to make a stable one-package coating.

Suggested Formula

	lb	gal
Urethane resin (70-A)	572	73
Mineral spirits	180	28
Lead naphthenate (24%)	8.3	0.83
Cobalt naphthenate (6%)	3.3	0.41
Antioxidant or anti-skinning agent	1.0	0.125

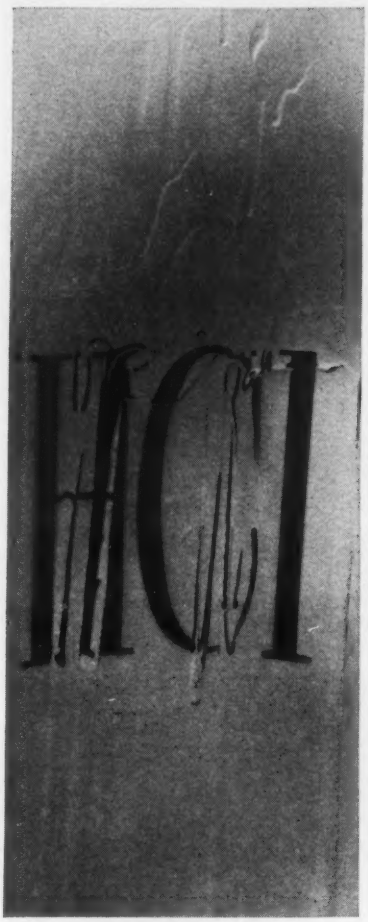
Total solids content of finished product is 53%.

(Nelco 70-A urethane resin is a product of The National Aniline Division, of Allied Chemical Corporation, 40 Rector Street, New York 6, New York.)

Check 1648 opposite last page.

BRIEFS

On muriatic acid solutions
Top-quality phenol
Extra-pure phosphorus trichloride



FAST WAY TO DILUTE MURIATIC ACID

You can probably save yourself some time by sending for our muriatic acid data sheet.

A quick look at the dilution table it contains tells you how much of the acid you need to make up solutions of various strengths.

The same sheet gives you good advice on safe handling of muriatic acid and lists our specifications.

A glance at these specs shows you how extremely pure our product is. "Hooker White" grade, completely free of arsenic and free chlorine, contains no more than 0.0001% iron, a maximum of 0.003% sulfates and 0.0002% maximum organic matter.

The commercial grade, nearly as pure, contains 0.0005% iron at most, a trace of free chlorine, 0.003% sulfates, not over 0.001% organic matter, and no arsenic.

Check the coupon for data sheet.

HIGH-QUALITY PHENOL

Typically assaying over 99.5% by bromination, our phenol has more than purity to please you.

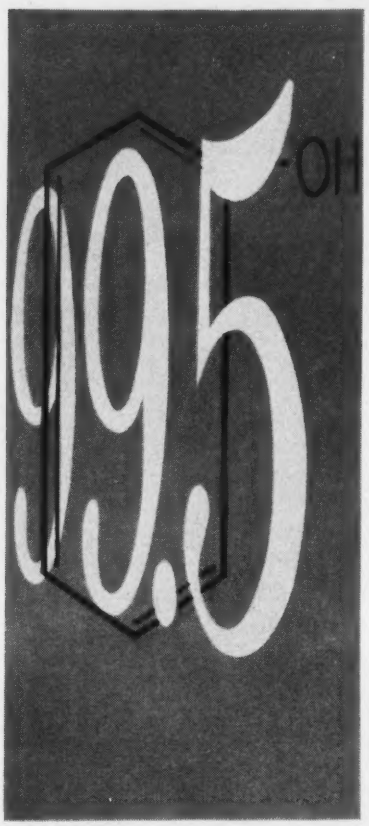
It has a freezing point of 40.6°C. minimum.

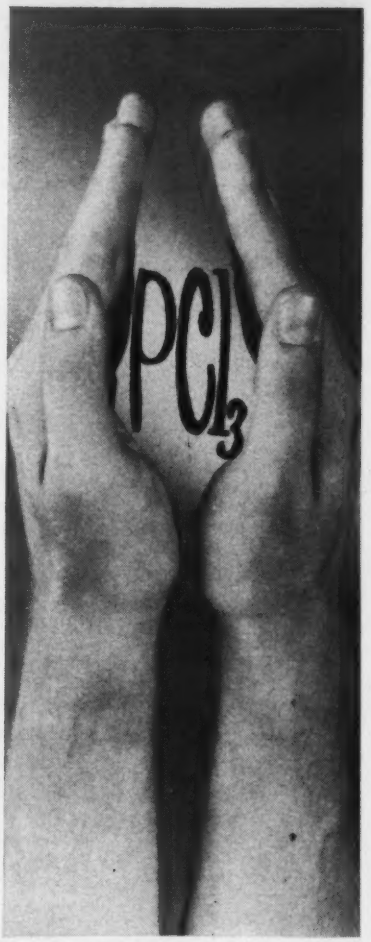
Its distillation range is only 2° from first drop (180°C.) to dryness.

Its color is 20 A.P.H.A. maximum at time of shipment.

Hooker phenol meets or exceeds the requirements of U.S. Pharmacopoeia XV.

Our data sheet gives all the specs. Just check the coupon.





EXTRA-PURE PCl_3 AT NO EXTRA COST

Why settle for less?

Our phosphorus trichloride is a water-white liquid that typically assays 99.9%. It has no free phosphorus, no turbidity.

It distills 97% between 74.5 to 78.0°C.

Use it as a chlorinating agent in making organic acid chlorides, as a condensing agent in preparing organic aldehydes, and as a catalyst in certain chlorination reactions.

For technical data sheet, just check and mail the coupon. For information on PCl_3 and other Hooker chlorinating agents, check the coupon for Bulletin 328-B.

For more information, check here and mail with name, title and company address.

☐ Muriatic acid ☐ Phosphorus trichloride
☐ Phenol ☐ Bulletin 328-B

For the complete line of Hooker chemicals, see Chemical Materials Catalog or Chemical Week Buyers' Guide.

HOOKER CHEMICAL CORPORATION
511 Forty-seventh Street, Niagara Falls, N. Y.

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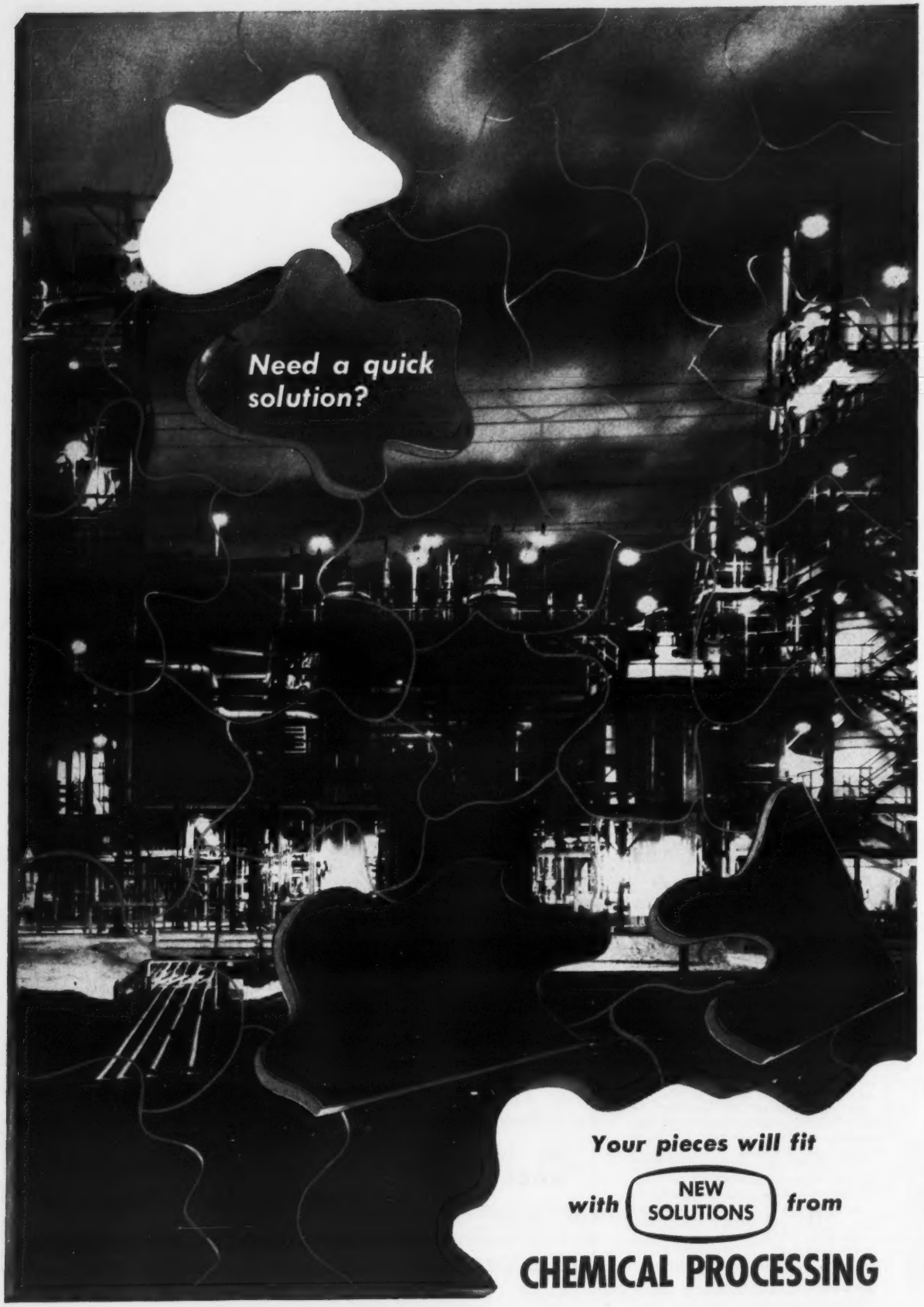
HOOKER CHEMICALS PLASTICS

Check 1649 opposite last page.



All 16 rare earth metals are now available from reproducible source

Availability of a reproducible source of all 16 rare earth metals has been announced. Purities are 99+%. Compounds should be of considerable research interest in the field of metallurgy, solid state physics and chemistry, as well as in fundamental studies.

Rare earth metals have widely variant physical properties as contrasted to the relatively similar trivalent oxides. Melting points vary from 804°C for cerium to 1650°C for lutetium. Boiling points range from approximately 1500°C for europium to 3500°C for lanthanum. Corrosion rates are markedly different for individual metals. Magnetic properties vary from those of diamagnetic yttrium to ferromagnetic gadolinium.

(Rare earth metals are available from Kleber Laboratories, Inc., PO Box 68, 2530 N. Ontario St., Burbank, Calif.)

Check 1650 opposite last page.

Higher functionality of polyepoxides permits variety

Uses: Polyepoxides are expected to find application in coatings in particular. They can also be used in tooling, encapsulating and potting, as well as in the preparation of laminates, adhesives and vinyl stabilizers.

Features: Availability of more than two reactive epoxy groups gives polyepoxides the advantage of higher functionality. This will permit resin formulators and users to vary the properties of end products to a greater degree than was previously possible.

Description: Polyepoxide resins, designed KER resins, are derived from an ortho-cresol-formaldehyde novolak which is reacted with epichlorohydrin. Molecular weight of the novolak determines the molecular weight of the resin. Functionality may range from 2.5 to 5.5.

For coatings applications,

A PRIME SOURCE

Organic and inorganic chemicals

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Check 1651 opposite last page.

polyepoxides can be used in preparation of epoxy-derived esters. Laboratory reports show that less time is required for the esterification reaction. In many instances, a catalyst is unnecessary, depending upon the softening point of a particular resin and the amount of oil involved. The esterification reactions proceed at 180°C. Esters exhibit good solubility in mineral spirits.

(KER resins are products of Tar Products Div., Koppers Company, Incorporated, Koppers Building, Pittsburgh 19, Pennsylvania.)

Check 1652 opposite last page.

Improved detergents possible with these difunctional acids

Uses: These two acids have been recommended for detergent formulations, high dropping-point greases and flotation reagents.

Features: Products offer improved detergent formulations at lower costs by combining alkali metal, ammonium or substituted ammonium salts of sulfated aliphatic alchohols with similar salts of alpha-sulfonated fatty acids. Difunctional compounds have a strongly acidic sulfonic acid group and a weakly acidic carboxylic acid group within the molecule. Both acids and derivatives have unusual solubility and surface active properties.

Description: Anionic surface active agents are alpha-sulfopalmitic (Armosul 16) and alpha-sulfostearic (Armosul 18) acids. They are off-white, slightly hygroscopic powders which are soluble in water and polar organic solvents. They are relatively insoluble in aliphatic hydrocarbon solvents.

Preliminary tests indicate that the Armosul acids have a relatively low level of oral toxicity. Both acids are available in pilot plant quantities.

(Armosul 16 and 18 are products of Armour Industrial Chemical Company, Division of Armour and Company, 110 N. Wacker Drive, Chicago 6, Illinois.)

Check 1653 opposite last page.

NEW AND IMPROVED

Airmatic Tube-O-Matic® Design

WITH

air foil flow

NO CLOGGING, NO OBSTRUCTION OF FLOW IN VALVES

Squeeze action—with new and improved design in air foil flow—controls air, oil, chemical and even grinding slurries faster and with less pressure drop. There is straight through flow with no obstruction to passage of solids or contaminants.

There are no points of wear, no poppets, no spools and no metal to metal contacts. Ask about it. See it. Install it. Ask for Bulletin 91043.

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AX-31

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Phone: WOodbine 1-5320 - WESTERN UNION: Airmatic Valve Inc. FAX: Cleveland, Ohio

Check 1654 opposite last page.

DELIVERY: Often a challenge!

Delivering this 165 foot, 135 ton fractionating tower on schedule often had its moments.

Built by Sun Ship for a petrochemical company's gas-processing operations, this giant tower presented quite a challenge enroute. Passing through narrow bridges with mere inches to spare, became routine.

But we're used to handling unusual situations. We specialize in designing and building to the most unique requirements. You can be sure of precision engineering and construction on any type of project, from intricate equipment to cargo ships.

Our diversification applies to delivery also. Besides our experience with railroads, being on the hub of the Delaware River makes us a natural for shipment by water.

BUILDING FOR LAND: Pressure Vessels • Fractionating Towers
Stills • Tanks • Condensers • Plate Work

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Dredges • Ferries • Marine Engines • Marine Machinery

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SHIPBUILDING & DRY DOCK COMPANY

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Check 1655 opposite last page.

Gas evolution whipped by use of additive in zinc dust paint

Tetraethyl orthosilicate blocks decomposition

The problem of packaged paints rich in zinc dust, gassing and separating when packaged, has been solved. Studies have shown that such gas evolution may be effectively controlled by the incorporation of tetraethyl orthosilicate in the paint formulation. A small amount of diethylene triamine or other basic material is also used to neutralize the acid content of the paint vehicle.

When vehicle is a glyceride drying oil, addition of diethylene triamine in an amount just less than that theoretically required to neutralize the free fatty acid in the oil speeds reaction of tetraethyl orthosilicate with moisture in the vehicle.

Previous investigations have indicated that moisture is the primary cause of gas evolution in prolonged-stored zinc paints. The second reason is the reaction between the zinc and free fatty acid (or acid content) of the paint vehicle.

(Based on patent 2,968,571 issued to American Smelting and Refining Company, 120 Broadway, New York 5, New York.)

(Further information about tetraethyl orthosilicate may be obtained from Union Carbide Chemicals Company, division of Union Carbide Corporation, 270 Park Ave., New York 17, New York.)

(Tetraethyl orthosilicate is also a product of Anderson Chemical Company, Division of Stauffer Chemical Company, 380 Madison Avenue, New York 17, New York.)

Check 1656 opposite last page.

Specialty plasticizers for vinyl films are covered in technical data sheet. Specifications, physical properties and typical performance data are included. Data Sheet 560 —Chas. Pfizer & Co., Inc.

Check 1657 opposite last page.

ERIEZ Magnetic Minute

60 seconds that will help you improve operating efficiency.

NOW!

THERE'S AN ERIEZ MAGNETIC DRUM FOR MOST EVERY INDUSTRIAL APPLICATION—LARGE OR SMALL

Whether you're processing fine, lightweight material or bulky, highly abrasive material, you'll find an Eriez magnetic drum separator to fit the job.

New 30" and 36" diameter Drums, capable of handling volumes up to 25,600 cu. ft. per hour, expand the Eriez line of magnetic drum separators to provide efficient removal of iron contamination in more industrial processes than ever before! Eriez drums now include sizes from 12" to 36" in diameter and widths of 8" to 84".

All models have these exclusive Eriez features: easy access to bearings without disassembling drum; simple removal of drum from housing without removing housing from flow line; convenient inspection panels at front and back of drum housings.

Models include magnetic drums and controlled-feed, packaged drum separators complete with housing and motor drive . . . standard and heavy duty constructions . . . with high intensity ERIUM®-Powered magnetic circuits for greatest separation efficiency.

For further information and consultation at no obligation, write:

ERIEZ MANUFACTURING CO.
73Y Magnet Drive, Erie, Pa.

MAGNA-THOUGHT

Keeping step with the growth of American and world-wide industry, Eriez continues to improve and expand its magnetic separation equipment to meet the challenges of new processes and increased production volumes.

R. A. WHITE
Product Mgr.
Separation Div.

ERIEZ

A GROWTH COMPANY . . .
10 NEW PRODUCTS IN THE LAST 5 YEARS

"See our exhibit at the Chem Show"

Check 1658 opposite last page.

NOVEMBER 1961

CUT HERE AND FILE

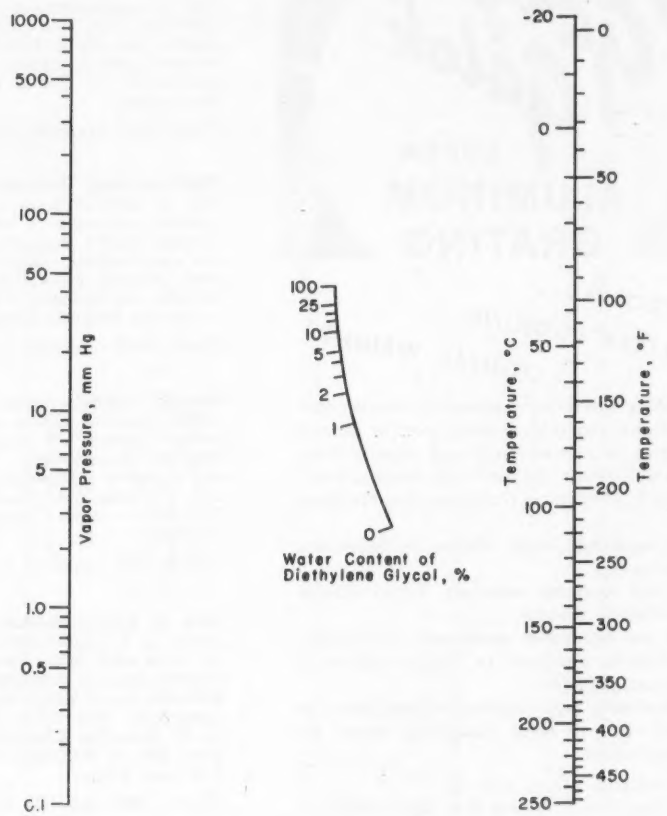
Vapor Pressures of Wet Diethylene Glycols

GEORGE E. MAPSTONE
Johannesburg, South Africa

Diethylene glycol is frequently used to dehumidify gases because of its low vapor pressure and high water-holding capacity.

To design a plant for this purpose, it is necessary to know the vapor pressure of the wet glycol both at the absorber temperature and at the temperature of the regenerator still.

The accompanying nomograph presents the vapor-pressure data as a function of the water content and temperature of the glycol.



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EXTRA STRONG . . .
BETTER LOOKING . . .
LIGHTER WEIGHT!

Exclusive swaging and forming process prevents cross bars from turning, twisting, coming loose or falling out . . . provides greater strength and rigidity than gratings using obsolete methods of joining bars. Only Gary Galok Aluminum Gratings offer all these advantages:

High strength to weight ratio. Minimum deflection . . . easier to install.

Non-rusting and corrosion resistant. Ideal where chemical conditions prevail.

Can be used for decorative purposes, sun-shades, grilles, etc. Can be anodized in sunfast colors to blend with surroundings.

Available with serrated or plain bars—in all sizes to meet practically every requirement.

*Patent Pending

Write for Bulletin A759
Dept. K-16, E. Seventh Ave., Gary, Indiana

ROCKWELL-STANDARD CORPORATION
Grating Division, Gary, Indiana

Check 1659 opposite last page.

NEW LITERATURE

Chemical Materials

Polyester and acrylic-modified polyester resins are dealt with in group of booklets that discuss physical and chemical properties and include suggested formulations for various applications. Curing characteristics of the different products are listed, along with specific properties of the cured resins. Paraplex P-series Resin Booklets — Rohm & Haas Company.

Check 1660 opposite last page.

Plastic starches are described in 10-page brochure which gives complete information on forms for conventional and aerosol packaging. Bul T-8—Polyvinyl Chemicals, Inc.

Check 1661 opposite last page.

Silicone antifoam agents' role in economically solving industrial foaming problems is reported on an eight-paged illustrated brochure. Prescribed use levels are given in comprehensive tables of properties. Tabulated data aids the selection for use in both aqueous and non-aqueous systems. "Silicone Antifoams" — Hodag Chemical Corporation.

Check 1662 opposite last page.

Rigid polyvinyl chloride products used in fabrication of corrosion-resistant equipment is subject of 23-page catalog. Applications, design specifications, chemical resistance, physical properties and accessories are included. Cat RV-61 — Kaykor Products Corporation.

Check 1663 opposite last page.

Strongly cationic cyclic tertiary amine, Onamine RO, is subject of revised bulletin of four pages. Physical characteristics, reactions and extensive application information are presented. Onamine RA data file — Onyx Chemical Corporation.

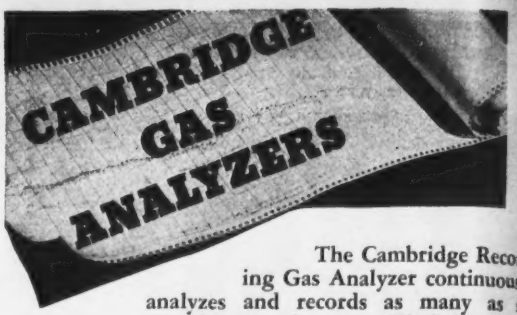
Check 1664 opposite last page.

Data on n-butyl alcohol are contained in 12-page bulletin including resin solubilities, chemical references, physical properties and an extensive list of binary and ternary azeotropes. Bul ATD 3-461 — U. S. Industrial Chemicals Company, Div. of National Distillers & Chemical Corp.

Check 1665 opposite last page.

Silicone fluids are covered in comprehensive technical reference which describes the broad range of major products. Two-color, two-page publication differentiates between available grades according to viscosity and classifies them on

To page 54



The Cambridge Recording Gas Analyzer continuously analyzes and records as many as six constituents of a gas. Eliminates intermittent, slow and expensive manual gas analysis. Accurate . . . Sensitive . . . Simple. No moving parts; utilizes thermal conductivity principle.

Makes possible substantial savings in the operation of kilns, production of inert gases, and in metallurgical, petroleum, and other chemical processes. Single and Multi-point instruments are available for a wide variety of applications.

Send for literature mentioning application

CAMBRIDGE
INSTRUMENT COMPANY, INC.
1673 Graybar Bldg., 420 Lex. Ave., N.Y. 17, N.Y.
Pioneer Manufacturers of
PRECISION INSTRUMENTS
SEE US AT BOOTH 376 — 27th EXPOSITION

Check 1666 opposite last page.

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PLASTIC LABORATORY WARE

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AVAILABLE FROM YOUR LOCAL SUPPLY DEALER

The MOST COMPLETE line available from ONE source

From beakers to pumps, from tanks to valves. Stock or made to order. Chemical processing equipment engineered to your specifications. If you have a problem concerning plastic laboratory ware, equipment or its applications, consult our technical department.

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PEQUANNOCK, N. J.
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PLASTICS for Science and Industry

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Check 1667 opposite last page.

ILLCO-WAY ionXchange

CONTINUOUS EXCHANGER

MAKES ION-EXCHANGE FEASIBLE AS A UNIT PROCESS IN MANY NEW CHEMICAL APPLICATIONS

Ion-exchange equipment of the conventional "fixed-bed" type is not always suitable for the more complex chemical-separation or recovery-concentration applications. Resin capacities in terms of product volume are often relatively low, and product analysis will vary throughout the cycle, since the operation is started with a freshly regenerated bed of resin and run until the bed is largely exhausted.

In the ILLCO-WAY Continuous Counter-Current IonXchanger, on the other hand, an adequate depth of *freshly regenerated resin is always presented to the product stream;* high regeneration efficiency and low product dilution are achieved. Total volume of resin required is often a fraction of the amount needed in fixed-bed exchangers. As a result of these advantages, separations and recoveries which are not feasible with conventional equipment can be handled by the Continuous IonXchanger.

CONTINUOUS ION-EXCHANGERS ARE SUCCESSFULLY OPERATING NOW

If you have an application which can be accomplished in the laboratory, IWT engineers can design and build practical equipment of any size.

For detailed information, address:

ILLINOIS WATER TREATMENT CO.
840 CEDAR ST., ROCKFORD, ILLINOIS
NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Can.

"See our exhibit at the Chem Show"
Check 1668 opposite last page.

CUT HERE AND FILE

processing and engineering data

Humidity Nomograph

W. L. PASSMORE
Ingersoll-Rand Company
Phillipsburg, N. Y.

The purpose of this nomograph is to find the molecular weight or the specific humidity of a mixture of air and water vapor when the temperature, pressure and relative humidity of the mixture are known.

The following formulas were used to construct the nomograph:

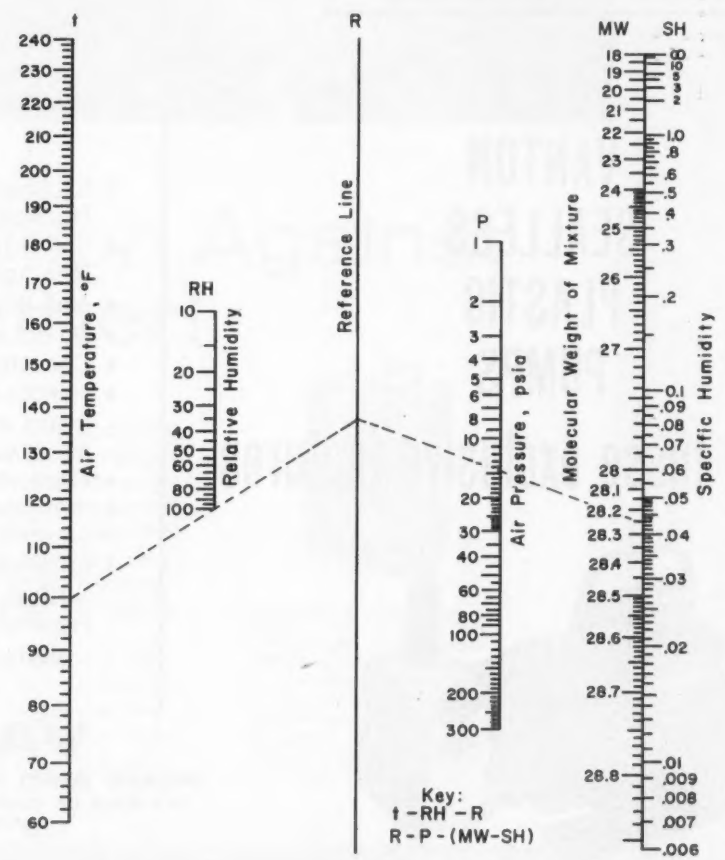
$$MW = 28.96\left[\frac{P_m - P_v}{P_m}\right] + 18\left[\frac{P_v}{P_m}\right]$$

$$SH = \frac{18\,P_v}{28.96(P_m - P_v)}$$

where: P_m = pressure of mixture, psia
P_v = partial pressure of water vapor, psia
MW = molecular weight of a mixture of air and water
SH = specific humidity, lb of water per lb of dry air.

Typical Example

For saturated air at 100°F and 14.7 psia, draw a line from 100°F through 100% relative humidity to the reference line. A line from this point on the reference line through 14.7 psia shows the molecular weight of the mixture is 28.30 and the specific humidity is 0.043 lbs of water per lb of dry air.



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STOPS LEAKS
PERMANENTLY:
prove it at our expense!

Use *Leak Lock* to seal thread and flange joints...to keep bolts, nuts and plugs from loosening under the most rigorous usage. It's been job-proved in thousands of applications to give these advantages...

- Withstands solvents that eat away other joint compounds.
- Remains flexible indefinitely ...joints won't freeze.
- Gives a tight seal under a wide range of temperatures, pressures.
- Does *not* heat spontaneously.
- Is unaffected by oil, gasoline, refrigerants, most gases and chemicals.
- Makes work easier... flows on and stays where applied.

Listed by Underwriters' Laboratories for gas, oil, propane and butane equipment.

FREE SAMPLE—*Leak Lock* is available in handy tubes and in cans. Write on your letterhead for sample tube.

HIGHSIDE CHEMICALS INCORPORATED
16 Colfax Avenue • Clifton, New Jersey

Check 1669 opposite last page.

DAWE'S
a dependable source for
SODIUM GLUCONATE and GLUCONIC ACID

Promptly available in any quantity.

Warehouse stocks across the country.

Dawe's high quality is assured.

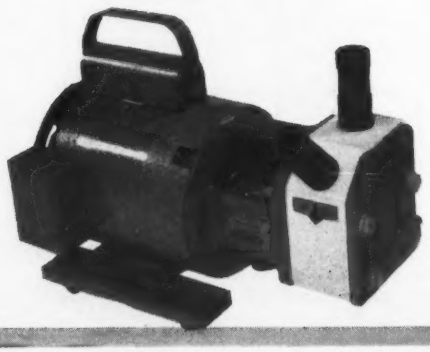
Write for technical data and samples.

DAWE'S LABORATORIES, INC.
4800 South Richmond Street
Chicago 32, Illinois

Dawe's

Check 1670 opposite last page.

ONLY VANTON SEALLESS PLASTIC PUMPS have all these exclusive features:



- No Shaft Seals— No Stuffing Boxes
- Self-Priming— Non-Agitating
- Non-Contaminating
- Do not leak
- Operate dry or wet
- Handle corrosive chemicals, gases and slurries with equal ease
- Capacity range to 40 GPM
- Temperature range from — 60°F. to + 350°F.
- 54 combinations of materials such as Teflon, PVC, Kel F, Hypalon and Neoprene

WRITE FOR CATALOG #10

VANTON
PUMP AND EQUIPMENT CORP.
DIVISION OF COOPER ALLOY CORPORATION
HILLSIDE, NEW JERSEY

"See our exhibit at the Chem Show"
Check 1671 opposite last page.

From page 52

the basis of physical properties. Index permits user to select a particular fluid on the basis of properties required in his application. Photos, curves and tables provide application ideas as well as pertinent data. Bul S-9 — Silicone Products Department, General Electric Company.

Check 1672 opposite last page.

Polyvinyl alcohols, fully hydrolized, are highlighted in 16-page bulletin that includes a detailed description of resin and film properties. Numerous graphs, tables and charts present data on physical properties and handling, including modifications. Uses in manufacture of paper, adhesives and textiles are covered. "Airco Vinol" Bul — Air Reduction Chemical & Carbide Co., Div. of Air Reduction Company, Inc.

Check 1673 opposite last page.

Aryl mercaptans brochure covers chemistry, suggested applications, recommended storage and handling methods, and literature references. Comprehensive 30-page booklet includes abstracted references concerning use of these intermediates in oil additives, polymeric systems, antioxidants, rubber chemicals and pharmaceuticals. "Aryl Mercaptans" — Research & Development Div., Pitt-Consol Chemical Company.

Check 1674 opposite last page.

The Platinum Metals

From page 33

process is also used as a preliminary step in synthesizing ammonia.

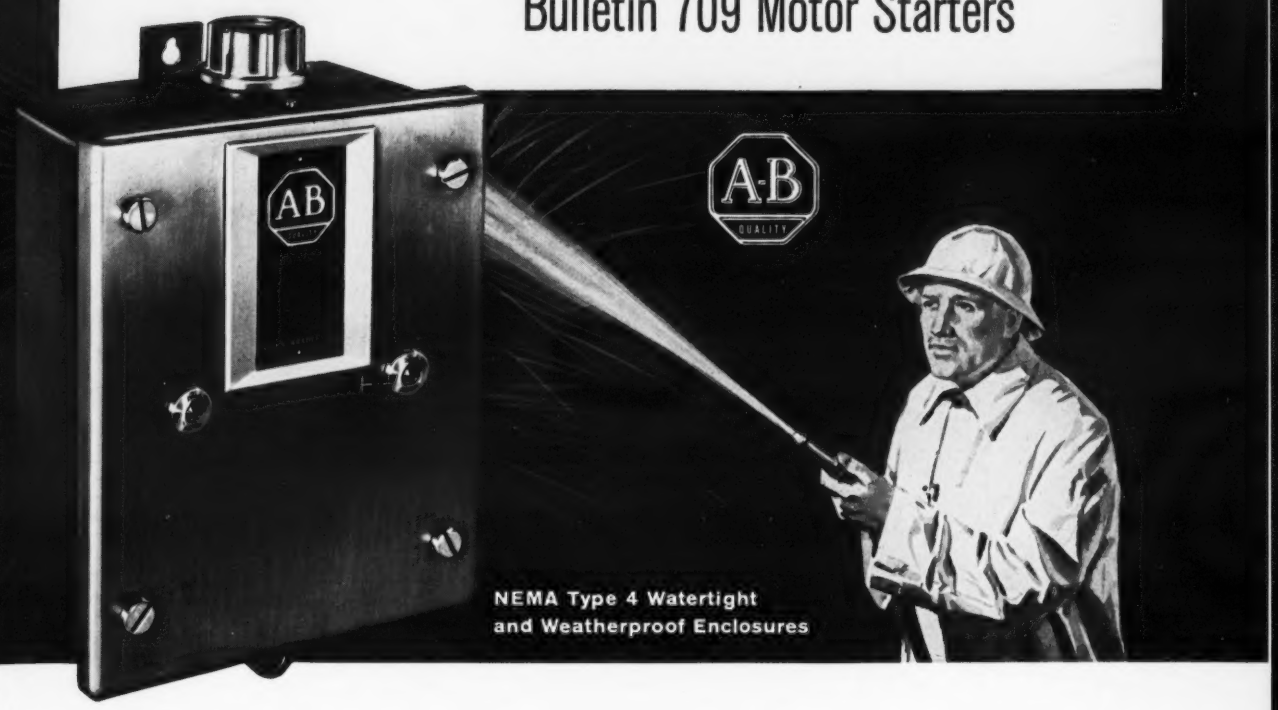
From the standpoint of economy, it is interesting to note that in these instances the catalyst will last indefinitely as long as care is taken to prevent its becoming inhibited by chlorides, sulfur compounds, carbon monoxide, oil or unsaturated hydrocarbons.

The Deoxo Puridryer removes oxygen from commercial hydrogen to less than one ppm and dries it to a dew point of better than —100°F. It can also be used with such gases as nitrogen, neon, argon and saturated hydrocarbons.

To page 56

For more information on product at right, specify 1675 . . . see information request blank opposite last page.

Allen-Bradley Nema Type 4
STAINLESS STEEL ENCLOSURES for New
Bulletin 709 Motor Starters

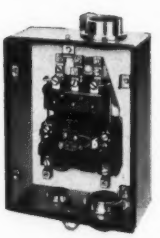


NEMA Type 4 Watertight
and Weatherproof Enclosures

Complete Protection Against Water and Weather!

Allen-Bradley's revolutionary, new line of Bulletin 709 motor starters, which includes reversing switches, multi-speed starters, combination starters, etc., is now available in stainless steel enclosures. Thus the benefits of reduced size, increased interrupting capacity, increased life, and longer trouble free operation can be given to all outdoor installations, or where a great deal of moisture is present. Designed for installation in dairies, breweries, meat and food processing plants and similar locations where a daily "wash-up" is required, the "eye appeal" of these stainless steel enclosures will also be an asset.

The standard Nema 4 enclosures are made of heavy gauge Type 302 stainless steel. However, Type 316 stainless steel can be furnished at a correspondingly higher price. There are many other features about these revolutionary starters that will interest you. Therefore, please write for Publication 6100: Allen-Bradley Co., 1316 South Second Street, Milwaukee 4, Wisconsin.



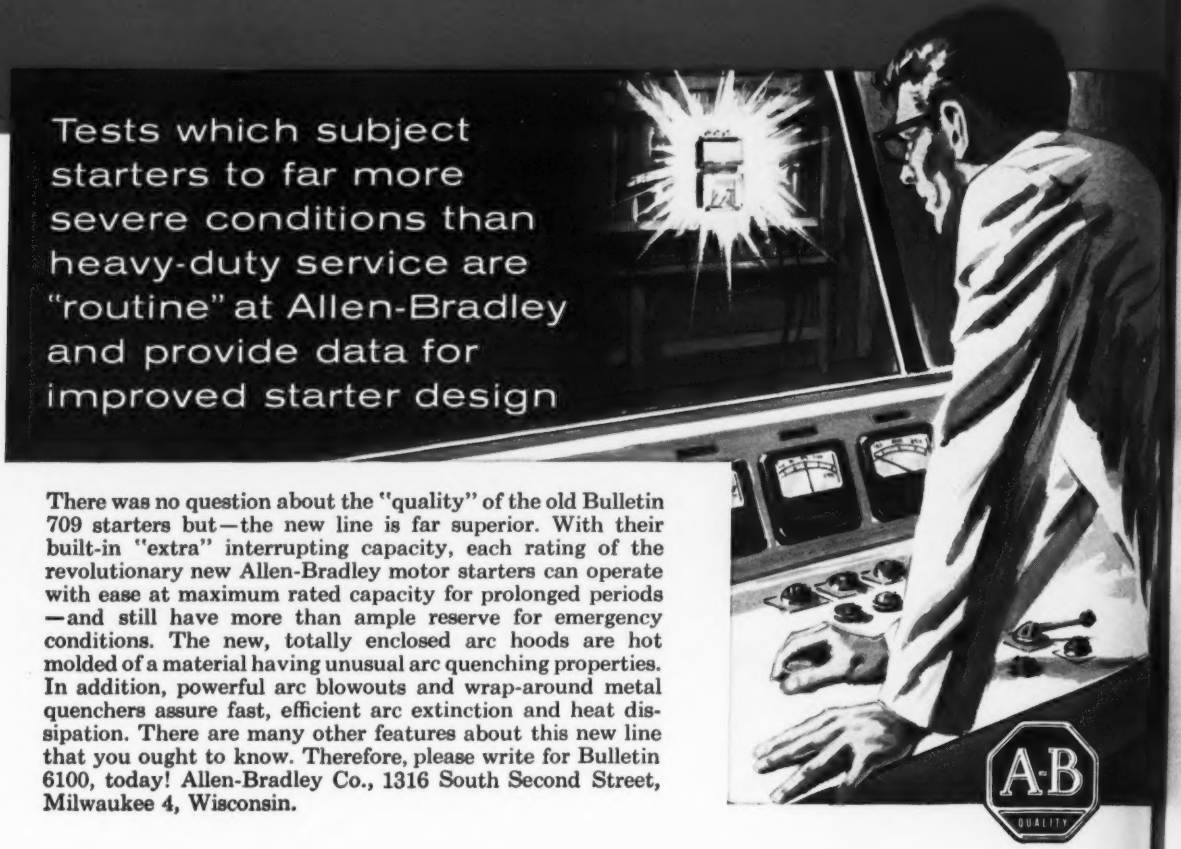
BULLETIN 709 SIZE 2
in watertight, weatherproof Stainless Steel Enclosure—for use where a great deal of moisture is present, such as tanneries, food processing plants, pump houses, dairies, breweries, etc., or in outdoor locations.

20-61-RM

ALLEN-BRADLEY
Member of NEMA

QUALITY MOTOR CONTROL

The Superior "Quality" of the New Allen-Bradley Starters GREW OUT OF DESTRUCTIVE TESTS


Tests which subject starters to far more severe conditions than heavy-duty service are "routine" at Allen-Bradley and provide data for improved starter design
A-B
QUALITY

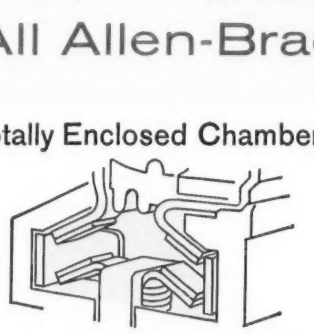
There was no question about the "quality" of the old Bulletin 709 starters but—the new line is far superior. With their built-in "extra" interrupting capacity, each rating of the revolutionary new Allen-Bradley motor starters can operate with ease at maximum rated capacity for prolonged periods—and still have more than ample reserve for emergency conditions. The new, totally enclosed arc hoods are hot molded of a material having unusual arc quenching properties. In addition, powerful arc blowouts and wrap-around metal quenchers assure fast, efficient arc extinction and heat dissipation. There are many other features about this new line that you ought to know. Therefore, please write for Bulletin 6100, today! Allen-Bradley Co., 1316 South Second Street, Milwaukee 4, Wisconsin.

Here's How EXTRA Interrupting Capacity Is Built Into All Allen-Bradley Starters

Powerful Arc Blowout

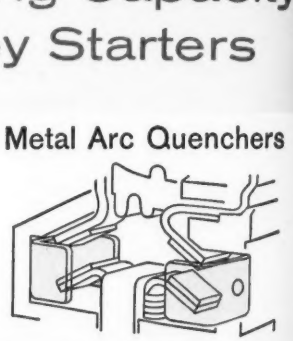
The powerful magnetic field, generated between the contacts when an arc is drawn, forces the arc off the end of the contacts. It is quickly cooled and extinguished by the large surfaces of the hood.

Totally Enclosed Chambers



A new, unusually strong and stable material is hot molded to extremely close tolerances. Each chamber of the arc hood is totally enclosed. Thus, the usual effects of ionization and heat are greatly minimized.

Metal Arc Quenchers



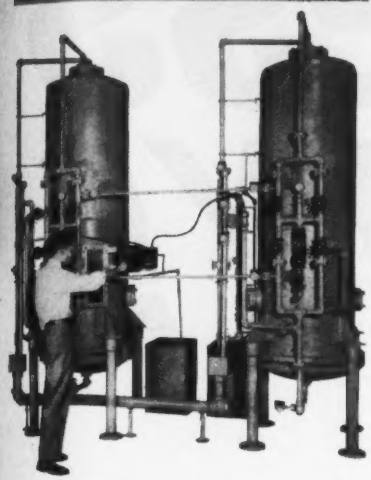
Size 2 starters and the higher ratings have metal quenchers in both the front and back of each arc chamber. This efficient construction gives the arc no chance to become destructive.

20-61-RH

ALLEN-BRADLEY

QUALITY
MOTOR CONTRO

BARNSTEAD
LOW COST
DEMINERALIZED WATER



UP TO
5000 G.P.H.
ENGINEERED
TO THE PURITY
YOU NEED

Above are two Barnstead MM-6 Mixed-Bed Demineralizers operating in parallel producing 5000 gallons of water per hour of extremely high electrical resistance. They can be operated separately . . . one unit being regenerated while the second remains in operation.

Barnstead engineers have simplified Mixed-Bed regeneration to keep operating costs low . . . no special skill in training needed to operate or regenerate. You get economical operation . . . trouble-free regeneration and rugged construction to last 30 years.

Standard equipment includes: Water-pressure gauge, flow meter, valves, eductors, built-in regenerant tanks, all interconnecting piping completely assembled, purity controller which shows when water is up to purity standards and when demineralizer should be regenerated.

FULL INFORMATION
AVAILABLE

Write for Catalog #160 describing the complete line of Barnstead Demineralizers including Mixed-Bed, Two-Bed and Four-Bed models.

Barnstead®
STILL AND STERILIZER CO.
22 Lanesville Terrace, Boston 31, Mass.

"See our exhibit at the Chem Show"
Check 1676 opposite last page.

CUT HERE AND FILE

Sizing Pump Motors

F. CAPLAN
Oakland, Calif.

The theoretical hydraulic horsepower of a 100%-efficient pump is given by the equation:

$$T = \frac{G H_p}{1714}$$

where: T = theoretical hydraulic horsepower
G = flow, gpm
H_p = total head, psi

The actual or brake horsepower is given by the equation:

$$B = \frac{T}{E}$$

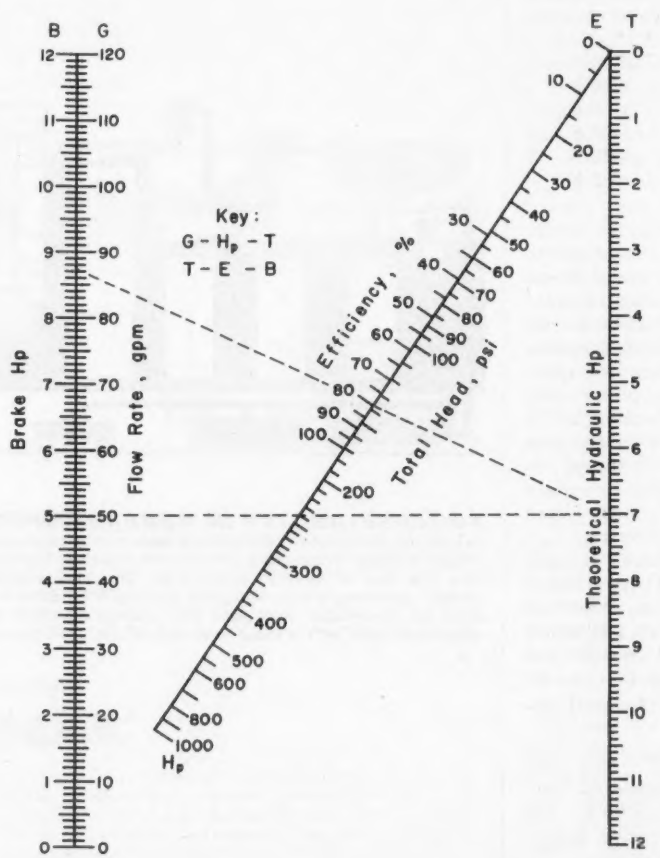
where: B = brake horsepower
E = pump efficiency

Typical Example

What bhp is required for an 80%-effiicient pump to deliver 500 gpm at 240-psi head? Align G=500=10(50) with H_p=240 and read T=(10)7=70; align T with E=80 and read bhp= (10) 8.75=87.5.

Literature Cited:

Perry, J. H., *Chemical Engineers' Handbook*, 3rd ed, pp 1416-17, McGraw-Hill Book Co., New York (1950).



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The Platinum Metals

From page 54

The hydrogen-palladium diffusion process makes possible the economic generation of ultrapure hydrogen through a special palladium-silver alloy.

Other units available include the Deoxo Indicator for the detection and continuous measurement of small amounts of oxygen and hydrogen in industrial gases; the Minoxo Indicator for the detection and measurement of traces of molecular oxygen in other gases; and Nitroneal Generators for the production of pure nitrogen with a controlled hydrogen content that can be maintained at any desired percentage between 0.5% and 25% within close tolerances.

Resist High Temperatures And Corrosion

The following table of melting points for the platinum metals, along with their known resistance to corrosion, makes their refractory value readily apparent:

Palladium	2826°F
Platinum	3216°F
Rhodium	3560°F
Iridium	4429°F
Ruthenium	4442°F
Osmium	4892°F

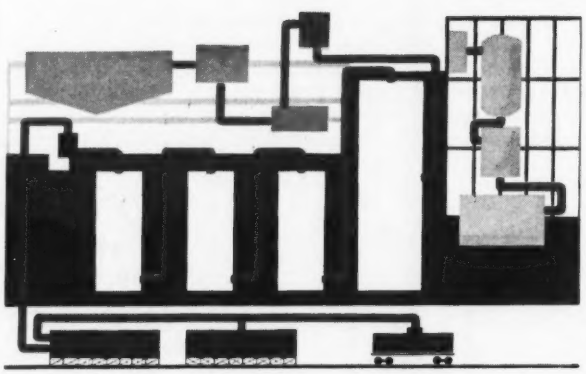
Thermocouples for the measurement of high temperatures in a variety of atmospheres employ a wide range of platinum-metal combinations and such base metals as tungsten and rhenium. They are used, for example, to obtain the temperatures of heating baths, wall temperatures in reactors or transfer lines, liquid or vapor temperatures in reactors and flow-through pipes and in control devices.

Among the more unusual refractory products are filters consisting of tiny, identical spheres of platinum, palladium or their alloys which are welded into pads for use in the missile and chemical industries.

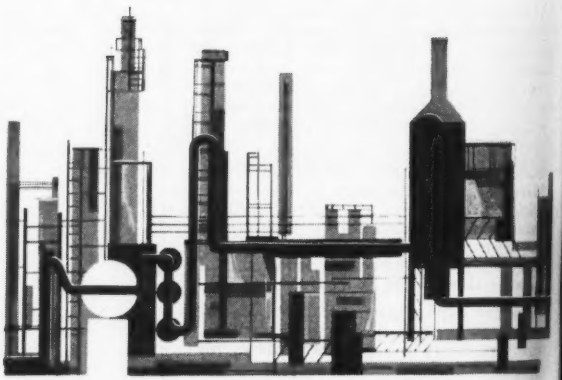
These filters are not only capable of withstanding temperatures about 3000°F, but are so highly corrosion resistant that they have been employed in operations which necessitate their being cleaned

BLAW-KNOX

PROCESS -ABILITY!



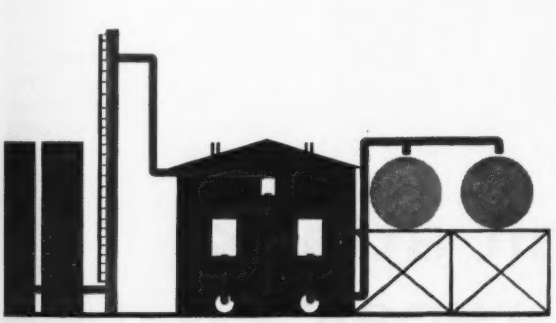
PROCESS-ABILITY IN GENERAL CHEMICALS *Typical of Blaw-Knox contributions here is the cooperation with a major producer of chlorine and caustic soda, in the development of a new type of Mercury cell design. This cell is being used in several operating plants designed and built by Blaw-Knox. Blaw-Knox has completed more than 100 process plants in the general chemicals field with a value in excess of 250 millions of dollars.*

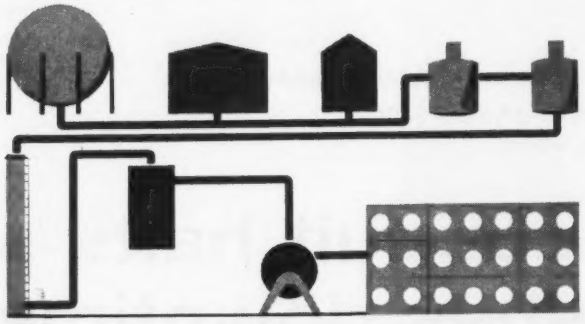


PROCESS-ABILITY IN PETROLEUM AND PETROCHEMICALS *Blaw-Knox has completed nearly 100 refining and processing plants in this broad field. Individual projects include refining of crude; production of petrochemical intermediates; production of monomers, fuel additives and plasticizers. Blaw-Knox offers many licensed processes which are made available by major oil and chemical firms both in the United States and abroad.*

IMPORTANT WORDS TO GROW WITH

Process-Ability describes the Blaw-Knox business-engineering service that develops your plan for process development, expansion or modernization. Bringing into a single focus all the factors that determine process feasibility, this important service can give you a clear picture of profitability *before* the investment of capital. ■ Blaw-Knox Process-Ability is the result of more than two decades' growth and refinement. Process-Ability can minimize research and development work; translate new or existing process data into commercial plant designs; apply the newest processing techniques, and give you realistic cost estimates *before* capital commitments. ■ Blaw-Knox Process-Ability is reflected in over four hundred completed processing facilities totalling more than eight hundred millions of dollars in corporate assets. It has resulted in the completion of process plants in such far-flung areas as Egypt and Australia, Holland and Mexico, Japan and England, Denmark and Brazil. ■ If you are considering expansion for profit, you will want to consider Blaw-Knox Process-Ability and its many unique contributions to the Processing Industries. A letter to Mr. C. F. Hauck, Vice President, will bring a full description of our services. Blaw-Knox Company, Chemical Plants Division, Blaw-Knox Building, Pittsburgh 22, Pa. District offices in New York, Chicago, Houston, Birmingham and San Francisco.





PROCESS-ABILITY IN FATS AND OILS *Blaw-Knox is perhaps best known in the fats and oils industry as the developer of the Rotocel Extractor used for the extraction of oils from oil seeds such as soybeans, cottonseed, corn germ and flaxseed. Installed capacity of Rotocels exceeds 2,500,000 tons-per-year of oil-bearing seeds. Total value of ninety-five Blaw-Knox installations in this field is in excess of 30 millions of dollars.*

PROCESS-ABILITY IN RESINS AND PLASTICS *Blaw-Knox experience in this field is represented by ninety completed plants valued at 150 millions of dollars. Early in World War II Blaw-Knox was chosen by the Defense Plant Corporation and the major rubber companies to design and build synthetic rubber plants. Since that time, Blaw-Knox has designed, engineered or constructed the majority of the free world's synthetic rubber plants.*

Chemical Plants Division

BLAW-KNOX

BLAW-KNOX

Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms • Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes • Towers and Special Structures • POWER: Power Plant Specialties and Valves

"See our exhibit at the Chem Show"

Check 1677 opposite last page.

with acids, including aqua regia, one of the most corrosive substances known.

The literature of atomic energy also includes, among others, a reference to an instance in which platinum filtering apparatus was found to minimize the effects of radiation on chemical processing in intensely radioactive fields.

An atomization process enables our company to produce uniformly-sized spheres and pore sizes from five to 40 microns with an accuracy of ±10%. Their porosity varies, with the size of the spheres, from 25-35%.

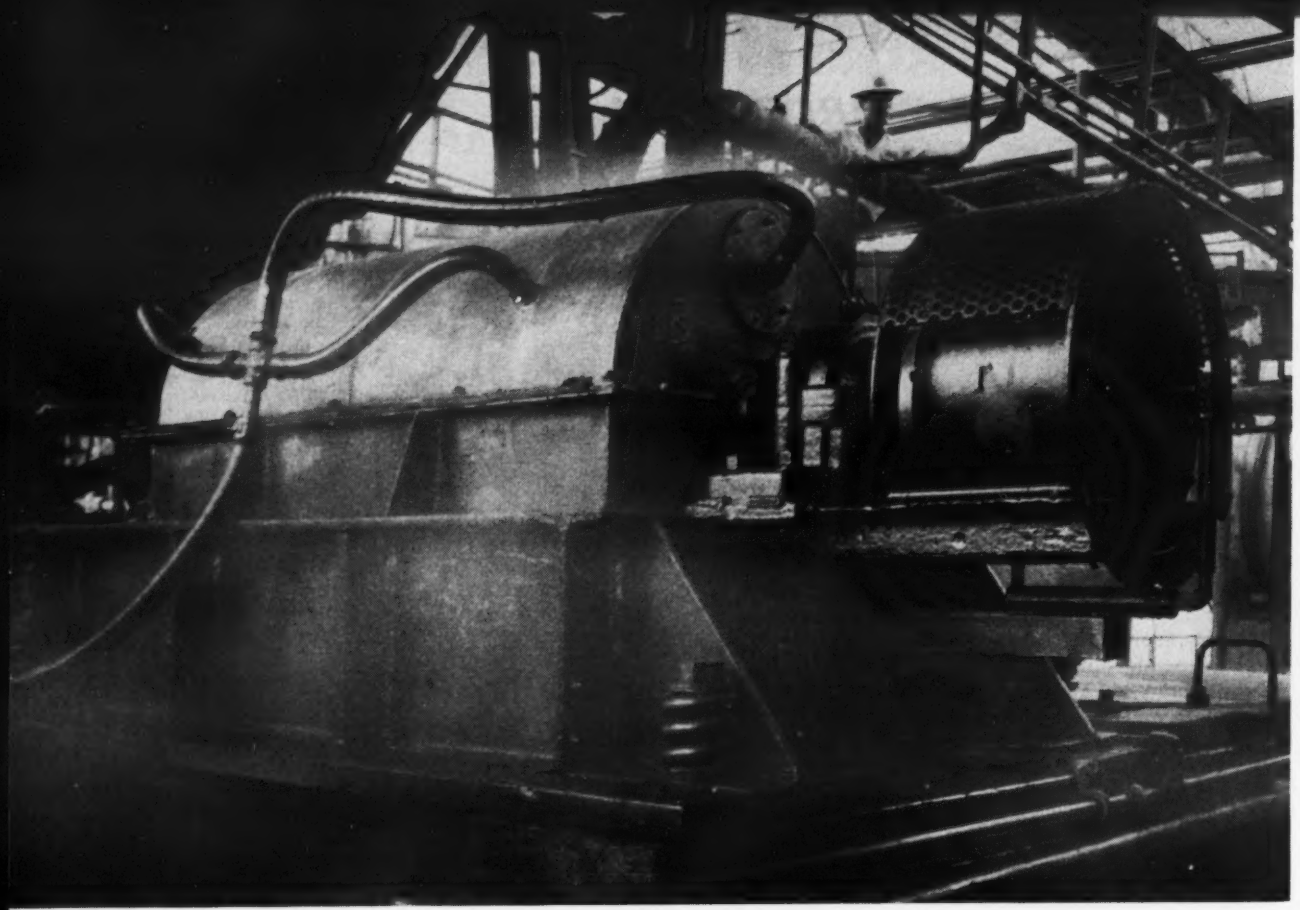
Precious-metal laboratory ware, tubing, resistor wires and furnaces have long been provided for refractory operations. Rupture discs, which can function in corrosive atmospheres at high temperatures, protect pressure vessels and pipelines. They can be fabricated to burst at pressures ranging from five psi to 10,000 psi.

One of the best known applications for platinum metals is in spinnerettes for the production of synthetic fibers such as viscose rayons and fibers where the nature of materials used is highly corrosive. Spinnerettes may have as many as 25,000 orifices, with a diameter tolerance of 0.0001 inch.

Production of platinum metals in the U.S. has increased several times over in the past few decades, mainly reflecting increased use by industry. In 1960 production was 775,214 troy ounces. This is expected to increase to 950,000 troy ounces by 1965.

A few decades ago, 90% of the annual domestic production of the platinum metals went to the jewelry industry. In 1960 only 8% was used for jewels. Of the remainder used in 1960, 50% went to the electrical industry and 34% to the chemical processing industries.

By far the largest portion of consumption in the CPI was in catalytic form. While catalytic applications continue to expand, greater emphasis on higher operating temperatures is providing renewed interest in the refractory applications of the platinum metals. ■



PVC conduit guards *electric wiring against attack from corrosive atmosphere and steam above continuous centrifuge separating ammonium sulfate from liquor. The plant produces the salt by reacting* H_2SO_4 *with* NH_3

Are corrosive conditions destroying electrical conduit and fittings in your plant? If so, take a tip from Best Fertilizers Co. where . . .

PVC conduit halts salt attack — slashes downtime, repair costs

J. L. MACFARLANE,
Electrical Superintendent
The Best Fertilizers Co.
with **CP STAFF**

A NEW SOLUTIONS FEATURE

Problem: Corrosion was gradually gnawing away at existing metal conduit and fittings in and around the ammonium sulfate plant of the Best Fertilizers Co., Lathrop, California. The caustic atmosphere attacked just about everything made of conventional metal. Because of their desiccant properties, salt crystals collected everywhere. Presence of steam in the air added more moisture and made the corrosion situation worse.

Electrical-enclosure covers had to be replaced at least once a year. The brass screws corroded out after only six months, requiring either replacement or switching to a more expensive corrosion-resistant metal.

It was almost impossible to maintain water-tight seals on connecting boxes, junction boxes and other conduit fittings. Since all the equipment was located outdoors, the threat of short-circuiting existed every time it rained. Also, as part of a continuous preventive maintenance program, the plant is constantly being hosed down. Water penetration accounted for frequent shutdowns.

Numerous techniques were tried to curb corrosion and preserve the conduit and fittings. Among the practices used were wrapping with corrosion-resistant tape, applica-

View of PVC *conduit hung on 2" x 4" wooden supports with stainless-steel straps. This conduit has been in use for more than one year and still looks as good as new*

tion of rust-inhibitive coatings and continuous cleaning and periodic sandblasting. None of these, however, provided an effective cure.

Solution: The company initiated a program of replacing the metal conduit and fittings with units made of moderately priced, rigid polyvinyl chloride. The decision was based to a large extent upon the excellent performance that PVC pipe had given in other areas of the plant where moist SO_2 was present in the atmosphere.

The PVC conduit was hung on 2" x 4" wooden supports. Stainless-steel straps were used to fasten the raceways to the wood. Enclosures made of PVC were also employed. Covers were fastened with stainless-steel screws.

Results: The rigid PVC conduit and fittings have whipped the corrosion and maintenance problems caused by the caustic atmosphere.

The plastic units have been in service more than a year and do not even look dirty, despite the fact that they have received little or no attention or maintenance.

At present there are approximately 1000′ of 1½" and ¾" PVC conduit installed, mainly serving 30-hp, 440-volt, 60-cycle, TFC electric-motor drives for continuous centrifuges. In addition, a PVC raceway goes to a five-hp unit driving a slurry-circulating pump and an auxiliary motor drive. (The plant also has about 5000′ of PVC instrument tube installed on air-activated instruments and reference lines. Cost of the tube is 2/3 less than that of copper and only 1/15 the price of stainless steel.)

When the overall conduit-replacement program has been completed, it is expected that more than 200,000′ of rigid PVC raceway will be in use. This should save a minimum of $4000 a year in maintenance, to say nothing of the benefits that will be realized because of the reduction in downtime.

EDITOR'S NOTE: *Although rigid PVC conduit has not as yet received the official nod from Underwriters Laboratories, Inc., for other than underground installation, UL reports that approval for broad use is currently being prepared. It is expected that the 1962 revision of National Electrical Code will include specifications pertaining to applications of PVC conduit.*

(Kraloy and Kralet rigid PVC conduit and fittings are products of Kraloy/Chemtrol Co., 402 W. Central Ave., Santa Ana, Calif.)

Check 1678 opposite last page.

Electrical *superintendent John Macfarlane points out area of difficulty on an enclosure. When cover corrodes, water enters conduit at this point and shorts out conductor*

Charles Devine, *shift production supervisor, checks corroded cover on electrical fitting. All conduit in this area of the plant will have to be replaced*

NEW–BLEACHED "WHITE" TEFLON* FILAMENT PACKING

CHEMPRO STYLE 400-FIW

THREE TO FOUR TIMES LONGER LIFE ON HIGH SPEED ROTARY AND CENTRIFUGAL SERVICE

Chempro Style 400-FIW square-braided, "white" Teflon filament packing uses duPont's newly developed bleached TFE fiber, which has been impregnated with Teflon suspensoid to create a 100% Teflon packing. It gives three to four times longer service on high peripheral speed operations where complete resistance to the product is required. In most cases, the new "white" filament packing requires *no external lubrication.*

"White" Teflon filament braided packing gives superior performance on high peripheral speed service through these two techniques:

1 *All carbonaceous material is removed from the Teflon fiber—Eliminates source of heat generated by carbon oxidation, precluding burning and hardening of the packing.*

2 *Teflon fiber preshrunk prior to braiding (at 580° F. for 30 hours)—Greater dimensional stability at elevated temperatures reduces swelling and frictional heat.*

Chempro Style 400-FIW Teflon packing is highly receptive to gland adjustment. No special techniques required for installation or "breaking-in" packing.

TYPICAL OPERATIONAL RESULTS HIGH-SPEED, SOLVENT-ACID REACTOR—On this high speed, corrosive service, conventional packing lasted only two days—Teflon-impregnated asbestos packing, and brown Teflon filament packing both lasted only one week. Chempro Style 400-FIW "white" Teflon packing, however, has been in use for over *three months* and shows no sign of leakage or appreciable wear.

3,600 R.P.M. CONCENTRATED MURIATIC ACID PUMP—Packing on the two-inch shaft of this acid pump previously gave plenty of trouble. Now, after installing Chempro Style 400-FIW packing, the pump has given *three months' service* to date, without leakage or pump down-time.

Chempro Style 400-FIW "white" Teflon filament packing is available in die-molded packing ring sets, in spools, and in coil form.

* duPont trademark

CHEMICAL & POWER PRODUCTS, INC.
9 Broadway, New York 4, N. Y.
The Original Fabricators of Teflon Packings and Gaskets

Check 1679 opposite last page.

CORROSION CONTROL

Graphite control valve resists 340°F, 75 psi

Uses: Controlling the flow of liquid corrosives, or solutions involving thermal shock.

Features: Impervious-graphite valve can operate at temperatures up to 340°F and pressures to 75 psi.

Description: Single-seated control valve is furnished with studs for standard ASA flange

Cutaway view shows Teflon-to-graphite seating in control valve

mounting. Teflon-to-graphite seating is used for positive closure and to assure maximum corrosion resistance.

Bodies come in 1 and 1½" sizes. Valve port diameters are ½, ¾, 1, 1¼ and 1½". Units are supplied complete with Fisher Governor topworks.

(Impervious-graphite control valves are product of Falls Industries, Inc., Solon, Ohio.)

Check 1680 opposite last page.

Polyurethane coating resists chemical fumes, splash, spillage

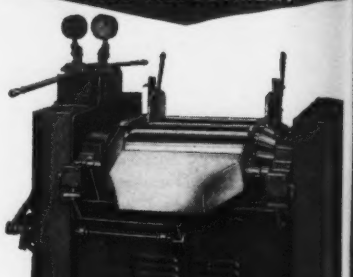
Product is specially designed for severe conditions

Uses: Protecting tank exteriors, structural steel, pump bases and similar units against corrosion and weathering.

Features: Coating resists attack from fumes, splash or spillage of most chemicals.

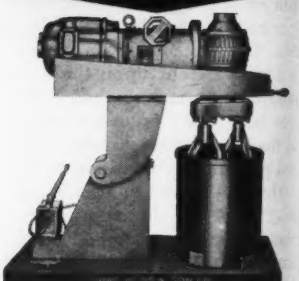
Description: Polyurethane coating system is designed for severe applications. Primer coat is applied two mils thick

NEW ROSS HIGH SPEED THREE ROLL MILLS WITH— ONE POINT HYDRAULIC ROLL ADJUSTMENT



- Pressure indicating gauges provide greater ease in properly setting rolls, and less skill or experience is required by operator.
- Roll pressure settings can be recorded for exact reproduction of material assuring standardization of product.
- Special equalizers assure positive parallelism of roll faces at all times for uniform dispersion and minimum maintenance costs.
- Mills have quick roll release with safety overload feature, and are convertible for either fixed or floating center roll operation. 2½x5, 4½x10, 6x14, 9x24, 12x30, 14x32, and 16x40" sizes.

Production size dispersion type Change Can Mixers with— **DOUBLE PLANETARY** stirrer action.



- Stirrers with special blade angles and very close clearances revolve on their own axis and also around can, developing 12 intense compression and shearing actions with each revolution to break down and disperse agglomerates.
- Variable speed for infinite range of stirrer speed control. • Simplified vertical hydraulic lift for greatest ease in cleaning down stirrers. • Non-revolving can is completely enclosed during mixing for safety and to reduce solvent loss. Cans can be jacketed or fitted with slide gate when required. Cans are easily positioned or removed from mixer.
- Extra heavy construction and standard type motor eliminate costly downtime. Oversized motor drives can be provided for kneading and mixing extremely heavy materials. 1, 2, 3, 4, 6, 8, 12, 25, 50, 65, 85, 125 and 150 gallon sizes.

Area of can contacted by stirrers during only one revolution of stirrers around can (2 seconds). Position of stirrers advances 4½° with each successive revolution to sweep entire area and all points on sides of can. Stirrers overlap each other as well as center of can.

Write for further information!
CHARLES ROSS & SON COMPANY, INC.
154 Classon Avenue, Brooklyn 5, N. Y.

"See our exhibit at the Chem Show"
Check 1681 opposite last page.

followed by a six-mil film of urethane. This is sealed off with one and one-half mils of the finish coat.

Product can be used over solvent-sensitive old paints. Final coating is hard, tough and has an attractive gloss. Weathering resistance is good.

In some applications the urethane coating may be applied at thicknesses up to 10 mils in one coat without bubbling or blistering.

A separate polyurethane coating system is available for use in mild corrosive atmospheres. It can be applied without a primer over a wide range of tight old paints.

(Further information about polyurethane coating systems 132 and 131 may be obtained from the Carboline Company, 32 Hanley Industrial Ct., St. Louis 17, Missouri.)

Check 1682 opposite last page.

Penton-lined pipe, valves and fittings made available

Uses: Handling corrosive and erosive solutions in chemical and allied industries.

Features: Penton-lined pipe withstands temperatures up to 250°F. Similarly constructed valves, fittings and pumps are also available.

Description: Commercial introduction of products was preceded by 30-month evaluation program conducted by manufacturer. Extruded Penton chlorinated polyether liners are 5/32 to 9/32" thick. Pipe size diameters range from 2 to 8".

Cost of pipe and fittings is approximately three times that of Saran-lined equipment produced by company.

(Further information about Pentherm pipe, valves, fittings and pumps may be obtained from The Dow Chemical Company, Midland, Michigan.)

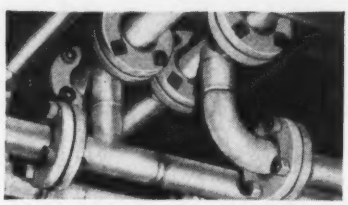
Check 1683 opposite last page.

For more information on developments in this section, check the Reader Service Slip.

DON'T BE HANDICAPPED BY OUTDATED SPECIFICATIONS!

YOU CAN SAVE MONEY ON PROCESS PIPING SYSTEMS!

IMPROVED FITTINGS DESIGN AND NEW PIPING STANDARDS CUT COSTS!



The ultimate installed cost of corrosion-resistant process lines *can* be substantially reduced . . . where pipe line design specifications take full advantage of up-to-date developments in improved fittings design and new piping standards.

The most recent issue of the Code for Pressure Piping, ASA B31.3-1959, allows use of *light wall* Stainless Steel Schedules 5 and 10 pipe and fittings for critical process lines to a degree not possible with *outdated* specifications. The broader scope of pressure-temperature operating conditions included in this new code, permits computations utilizing these more economical wall thicknesses. This, plus a specification recognizing the efficiency of Speedline fittings, guarantees a soundly designed system at a *lower* installed cost.

Every Speedline fitting has built-in advantages that contribute to lower installation cost because they are designed especially for use with light wall Schedules 5 and 10 pipe. Speedline's extra length feature means butt joints are easier to align and easier to weld because you're always connecting "straight to straight". There's ample clearance to attach flanges to any or all ends of a Speedline fitting without fouling—by expanding or welding. Speedline aligning connectors assure sound socket-joining for both pipe and fittings. With Speedline—*one fitting* does it all. Review your process piping specifications to be sure they call for all of the cost savings possible with light wall pipe and modern Speedline fittings.

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CORROSION-RESISTANT FITTINGS

STAINLESS STEEL • ALUMINUM • SPECIAL ALLOYS

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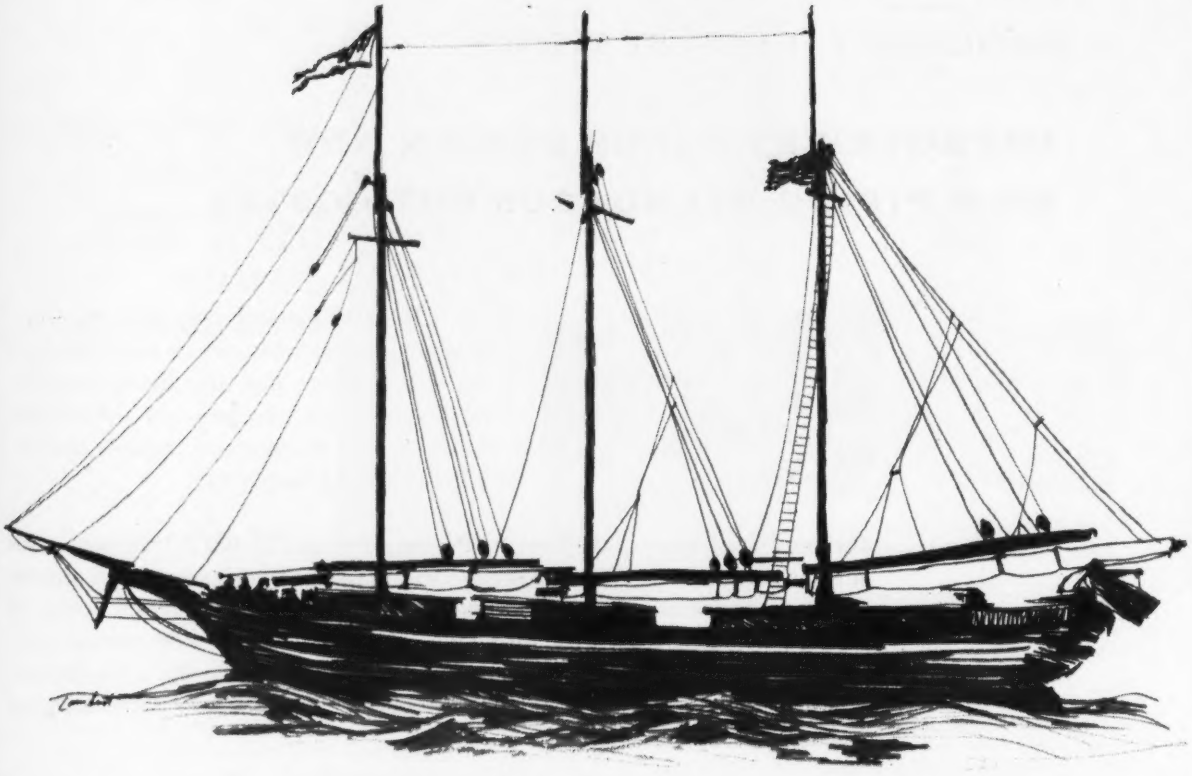

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You may be missing similar essentials in providing smooth sailing for your chemical processes—essentials that VCA can provide. For example, *Vancoram Ammonium Metavanadate* is necessary for best results in a variety of important catalytic processes, which include inorganic and a wide range of organic oxidation reactions. *Vancoram Sodium Metavanadate* is important in battling corrosion in alkaline-amine gas scrubbing systems, and in other corrosion inhibition applications such as the hot carbonate process. And *Vanadium Pentoxide*, basic raw material in the production of literally all Vanadium chemicals, is utilized in the preparation of catalysts for a multitude of chemicals—including sulfuric acid, phthalic anhydride, maleic anhydride, aniline black and adipic acid. Vanadium Corporation of America welcomes your inquiries on these and other Vanadium compounds, including Sodium Orthovanadate and Vanadyl Sulfate. Call your VCA representative or write VCA.
Valuable Offering: Write for free copy of 24-page "Bibliography of Vanadium Catalysts." Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y.

VANCORAM CHEMICALS

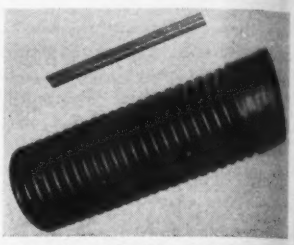
Check 1685 opposite last page.

Teflon spiral tube resists corrosion at −100 to 500°F

Uses: Handling corrosive liquids and gases in chemical, pharmaceutical and allied industries. Product is recommended for low pressure use only.

Features: The flexible tube is made of Teflon that withstands temperatures from −100 to 500°F.

Description: Seamless spiral tube is available in diameters ranging from ½ to 3 inches and in lengths up to 10 feet.



Seamless, flexible Teflon tube serves as good low pressure, connection for liquid and gas lines or electrical conduits

Ends are straight tubular suitable for clamping or lap joint. Sections with lightweight flanges are also available.

(More information about Fluoroflex-T spiral tubing may be obtained from Resistoflex Corporation, Roseland, New Jersey.)

Check 1686 opposite last page.

▸ A NEW SOLUTIONS ARTICLE

Acid line lasted 4 days—New one is still good after 5 years

Handles concentrated H_2SO_4 at Hiram Walker

Problem: Pipe conveying H_2SO_4 from proportioning pump to big 100 psi water main had to be replaced after only four days use at Hiram Walker and Sons distillery in Peoria, Illinois. The 20-foot section of one-inch diameter metal pipe had corroded to such an extent that further use was impractical.

Solution: The pipe was re-

placed by a corrosion-resistant, schedule-40, Hastelloy-C line. The H_2SO_4 that it carries is used to treat the water which is supplied by deep wells. The acid converts ferric and calcium carbonates in the water to the more soluble sulfates and thereby prevents pipe caking.

The water main supplies 20 million gallons of water per week to the plant for cooling purposes in distillation equipment and power plant.

Results: The new pipe has been installed over five years and shows no sign of wear. It is successfully handling H_2SO_4 having a wide range of concentrations since the acid is added in varying proportions. The liquid end of the pump is also made entirely of the same high-nickel content (58%), corrosion-resistant alloy.

(Further information about Hastelloy alloy-C may be obtained from Haynes Stellite Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, New York.)

Check 1687 opposite last page.

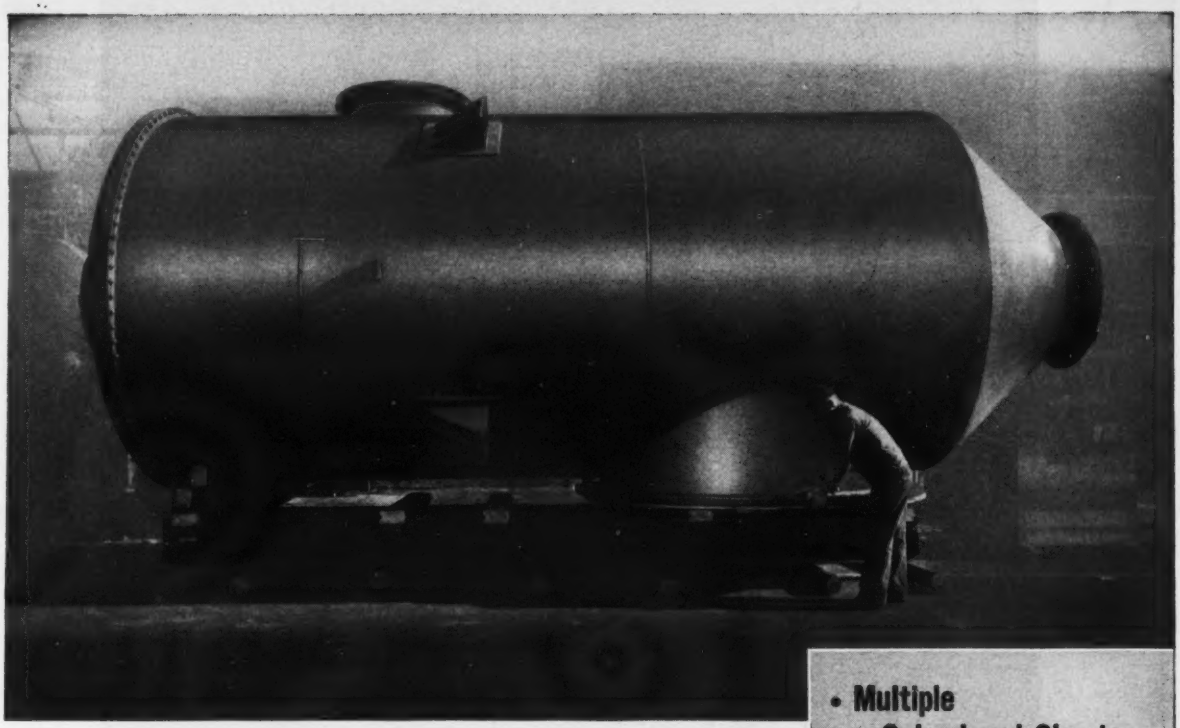
Aluminum alloys "shine" in corrosion tests

Cause least galvanic damage

Recent tests have shown that aluminum alloys cause the least galvanic corrosion when coupled to magnesium alloys. In the study, two magnesium-based alloys were coupled to seven aluminum alloys, mild steel, type-304 stainless steel (plain and chronium plated), red brass and monel.

The one-year exposure specimens revealed that there was no significant difference between galvanic corrosion caused by high-purity and commercial-purity aluminum alloys. The magnesium alloys suffered worst corrosion when in contact with brass, monel, mild steel and stainless steel.

(Based on technical paper presented at 64th Annual Meeting of The American Society For Testing Materials which was held in Atlantic City, New Jersey.)



MANHATTAN RUBBER LINED TANKS for PERMANENT Protection against Corrosion and Contamination

Costly process equipment for storing and handling corrosives deserves the degree of protection possible only with specially compounded, acid-proof Manhattan Rubber Linings. Thick, multiple calendered sheets of natural or synthetic rubber assure maximum durability under rough working conditions. The linings expand and contract with the tank metal under temperature changes . . . won't harden or crack. Their protection against most acids and alkalis is as fool-proof as 65 years of advanced technology can provide.

All Manhattan Rubber Linings are bonded to metal so securely actual tests have proved they can't be separated! And every Manhattan lined tank is tested under high voltage to assure flawless protection before being shipped to your plant. If your equipment is too large to ship to Manhattan, skilled crews will do the job at your location.

Be *sure* of permanent protection for your process solutions and equipment. Let an R/M representative show you the advantages of Manhattan Rubber Lined tanks, pipe and process equipment. Contact the Manhattan Rubber Lining plant or sales office nearest you . . . or write direct.

- Multiple Calendered Sheets
- Permanent Protection Against Corrosion, Contamination
- Permanent Rubber-to-Metal Bond
- Resistant to Acids, Alkalis, Abrasion, Temperature
- Largest Facilities Longest Experience
- Rubber Lining Plants at Passaic, N. J. North Charleston, S. C.

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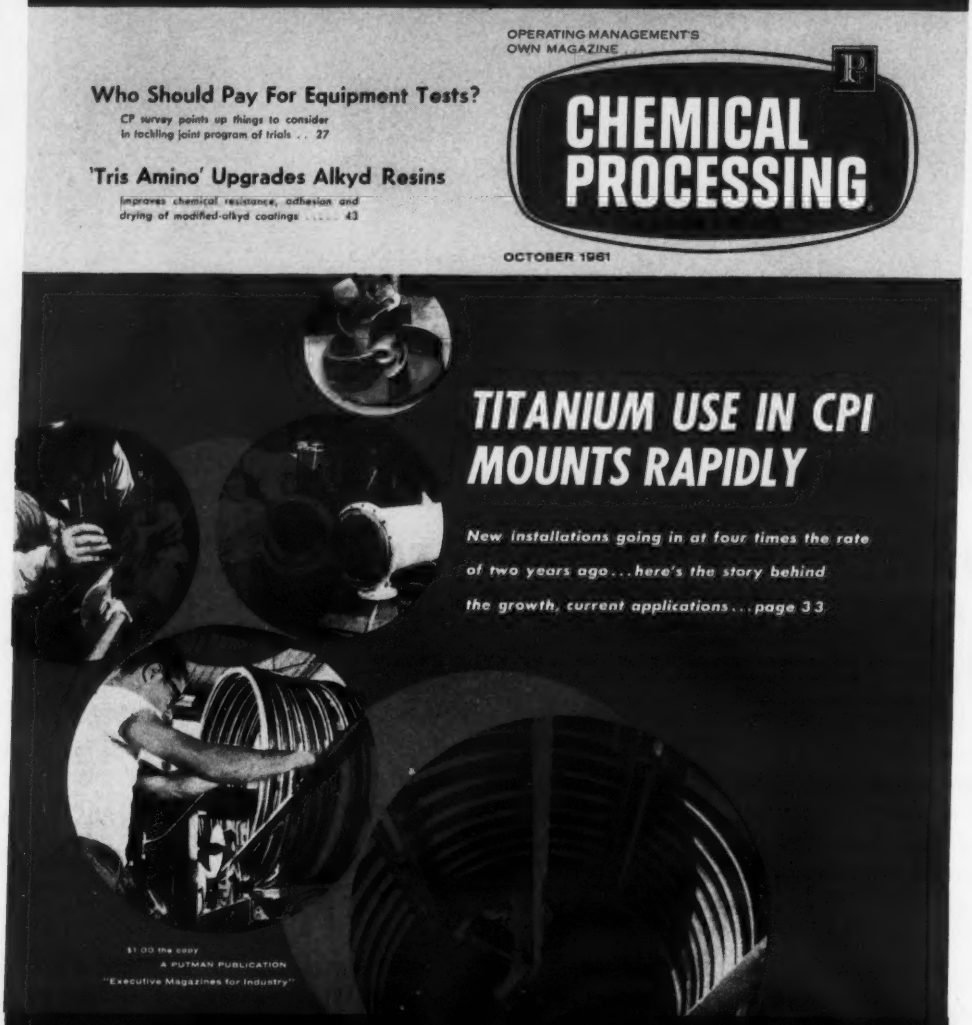
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OWN MAGAZINE
Who Should Pay For Equipment Tests?
CP survey points up things to consider
in tackling joint program of trials . . 27
'Tris Amino' Upgrades Alkyd Resins
Improves chemical resistance, adhesion and
drying of modified-alkyd coatings 43
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A DEFINITION . . .

"Granted that mathematicians, scientists, and engineers play a major role in the process of discovery, invention and application

"it remains for managers to translate the laboratory and drafting board discoveries into tangible goods and services for the community."

. . . Harvard Business Review, Sept-Oct, 1961
"Business Men in Power". Page 95.

perating management n the CPI*?

Please read again, in the definition above, the classification of the respective roles of 'technical specialists' and 'managers'.

CHEMICAL PROCESSING is vastly different from all other chemical magazines for its editorial appeals directly to Operating Management of the CPI*. Logically its reader audience is vastly different.

Who is "Operating Management"?
CHEMICAL PROCESSING's reader audience is made up of those who direct and control actual productive operations in chemical process plants . . . in contrast to the "technical specialists" in chemistry and chemical engineering.

Major chemical process plants report, in a current study, that of their men in "key positions"—17% hold chemistry degrees, 37% hold chemical engineering degrees, *while 46% hold "other degrees" or "no" degree.*

Obviously, "operating management" men must be, and are, selected from those demonstrating managerial ability . . . whether college years brought them technical degrees or not.

The 46% of "key position" operating men without chemical degrees emphasizes the necessity of editing to this vital group in terms of management problems and opportunities. And today the 17% and the 37% of management men with degrees are no longer simply "chemical specialists" . . . they too are operating management in function, responsibility and in their thinking.

CHEMICAL PROCESSING alone specializes in serving these responsible decision-makers, whose executive approval is essential in all purchases of significance.

Hence CHEMICAL PROCESSING is basic, your first and major medium delivering the vital audience of men in the key buying positions of Operating Management. For what product or service can be bought without Operating Management's favorable decision!

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When seconds count, reach for the Scott Sling-Pak. This model is the fastest piece of emergency equipment made. Ideal for fast, safe entrance into hazardous atmospheres. Cylinder holds enough pure breathing air for 15 minutes of hard work. Breathing protection at lowest cost.

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For dangerous jobs of longer duration. Safe, comfortable breathing protection for a minimum of 30 minutes at extreme exertion. Bureau of Mines Approval No. 1308.

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Designed especially to provide breathing protection in atmospheres not immediately dangerous to life and from which the wearer can escape without breathing equipment. Cylinder models and plant air-supply models available. Bureau of Mines Approval No. 1924.

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Check 1689 opposite last page.

Protective coatings for high temperature utilization evaluated

EVALUATION of protective coatings for high temperature surfaces proved difficult in a petrochemical plant in the Gulf Coast area. Organic coatings, particularly, could not be "cured," compelling an investigation into alternate procedures.

Results of test performed with silicone coatings, alkyds, zinc-rich organics, catalyzed epoxies and air-dried phenolic systems, as well as inorganic zinc silicate coatings, indicated that:

1) As expected, adequate surface preparation is necessary to achieve reasonable coating life.
2) Sandblasting is preferred method of surface preparation, with emphasis being placed on the proper grit size of abrasive (80 to 120 mesh).
3) Products considered for high temperature service should be field-tested under actual operating conditions.
4) Service life of each high-temperature coating tested was improved substantially by application over a permanent primer such as inorganic zinc silicate coating.

Zinc Silicate Primer Proves Effective

Some test results on hot process lines (900°F) show that all organics exhibited definite signs of failure within three months when applied over surfaces cleaned by power wirebrush and disc sanders. Sandblasting to brighten metal with a grit of 80 to 120 mesh significantly improved service life. When zinc silicate coatings were used as permanent primers on process lines, silicone systems that failed in a few weeks when applied directly to the metal in multiple coats, were still intact after two years' exposure when applied over this primer.

The coating system which

Dow Corning SILICONE DEFOAMERS

...BEST FOR EVERY JOB

Most effective. Dow Corning silicone defoamers are best for banishing space-filling, time-eating foam in the processing of any foamer . . . from asphalt to beans to peas to zein. Dow Corning Silicones start quicker, last longer. Eliminate messy and unsanitary foam-overs. Turn maintenance into production time.

Most efficient. Even the most violent foamers are tranquilized with a tiny amount of a Dow Corning silicone defoamer — often one part silicone solids per 10 million parts foamer is effective. For true economy, change to a Dow Corning antifoamer or defoamer. There's one just right for your product and system — oil, aqueous or food.

FREE SAMPLE

Send today for a generous trial sample and full data. Please specify type of system. Address Dow Corning Corporation, Midland, Michigan, Dept. 2723.

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Check 1690 opposite last page.

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PROTECTIVE'S PLASTIC LINERS

"DOUBLE WELD" POWER SEAL* (ROUND BOTTOM)

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FOR STEEL DRUMS, FIBRE CONTAINERS, CARTONS AND BOXES
ALL SIZES! ALL STYLES! POLYETHYLENE AND ALL FLEXIBLE FILMS

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DRUM LINERS ☐ Round Bottom ("Power seal") ☐ Straight Bottom ("Twin sure seal")

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Material packaged is—Solid ..... Semi solid ..... Liquid .....

CARTON LINERS

Carton size is—L ..... x W ..... x H .....

Material packaged is—Solid ..... Semi solid ..... Liquid .....

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Bag size required is—W ..... x L .....

Material packaged is—Solid ..... Semi solid ..... Liquid .....

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have tried to imitate our standards no one has succe

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For more information on product at left, specify 1691 . . . see information request blank opposite last page.

performed extremely well on stacks operating at temperatures in excess of 600°F consisted of one coat of inorganic zinc silicate prime, top coated with one coat of inorganic silicate coating pigmented with zinc oxide. One drawback to this system was sensitivity of white top coating to intercoat contamination. Even a most minute amount of curing solution residue left on the surface from the priming operation prevented adhesion of the top coat.

Although tests with 30 silicone coatings applied directly to metal were disappointing, it was discovered that they can be used to advantage to indicate breaks in refractory linings and thereby expedite repair during plant shutdowns. The silicones failed immediately where holidays developed in refractory lining on units with usual skin temperatures of 800°F. Even at lower skin temperatures (450°), the same phenomenon was noted.

(Condensed from technical paper, "Protective Coatings for High Temperature Service," presented at 1961 meeting of NACE, Buffalo, N.Y. by Gatewood Norman, the Firestone Tire & Rubber Company, Orange, Texas.)

Check 1692 opposite last page.

NEW FOR CHEMICAL PROCESS LINES

A pipe designed to carry corrosive fluids under high temperatures and high pressure . . . Johns-Manville

CHEMTITE PIPE

Now, after having proved its superiority in over 200 test installations, J-M Chemtite® Pipe is available to the chemical industry. Designed specifically to solve the problems of transporting highly-corrosive liquids, this pipe offers the maximum in economy and efficiency.

Chemtite Pipe is a mandrel-wound, asbestos-reinforced phenolic and epoxy pipe. It is manufactured by a unique "Pyro-Press" technique that insures good surface finish and close-tolerance dimensional control. Strong, flexible, abrasion-resistant asbestos fibers are combined with heat, pressure and chemically-resistant thermosetting resins. This results in a pipe with maximum corrosion resistance plus the ability to withstand pressures from a full vacuum to over 150 psi and temperatures from −50F. to +300F. It also has excellent thermal shock and can be steam-cleaned.

Light in weight and extremely easy to handle, long-length Chemtite can be installed quickly and easily. Its high physical strength and light weight permit its use for high overhead lines. Chemtite is easy to maintain, too.

Chemtite will be available in four basic types and in six different sizes (1" to 6"), in standard IPS outside diameters with an approximate schedule 40 wall, and with a wide variety of fittings which can be threaded and/or cemented. Chemtite can indeed be the answer to your most complex piping configuration—and at a low cost, too! For details, mail in this coupon today!

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Box 362, CP-11
New York 16, N. Y.
In Canada: Port Credit, Ontario

Please send me, without obligation, full information and technical data on the new Johns-Manville Chemtite Pipe.

NAME_____ TITLE_____

ADDRESS_____

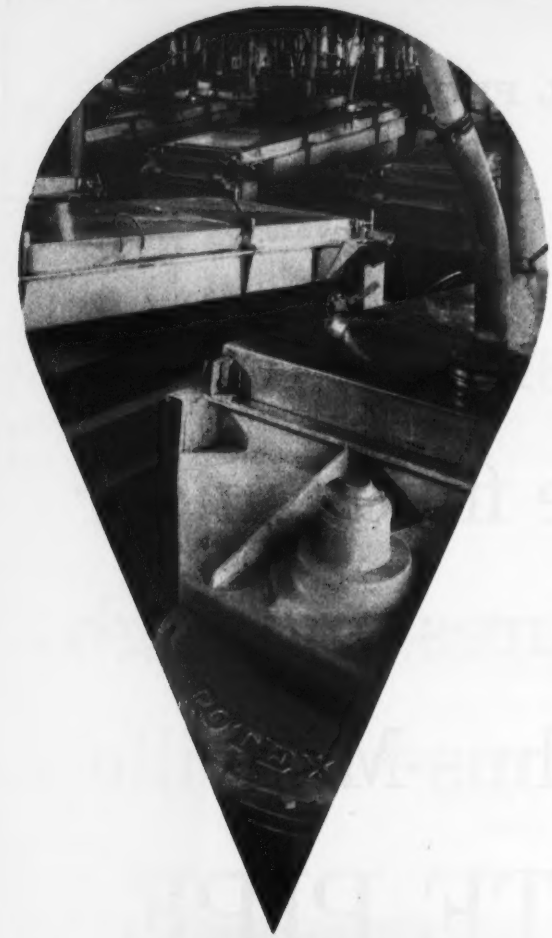
CITY_____ ZONE_____

COUNTY_____ STATE_____

JOHNS-MANVILLE

PLEASE VISIT OUR BOOTH AT THE CHEMICAL INDUSTRIES EXPOSITION

Check 1693 opposite last page.



EFFICIENT SCREENING REQUIRED

When the process requires accurate separations and high capacity - ROTEX is installed. Reason: the ROTEX screening action stratifies materials - coarse particles float up - fines sink down and through the mesh with quick precision. Whatever the process - chemicals - food products - paper - ROTEX Screeners are there. The ROTEX installation shown is one of several in Corn Products Company plants. ■ Learn more of ROTEX - write for new Bulletin 905 describing wet and dry separations - screening action - construction - single and multiple surface models for small and large capacities. Our experienced engineers will be pleased to cooperate with you.

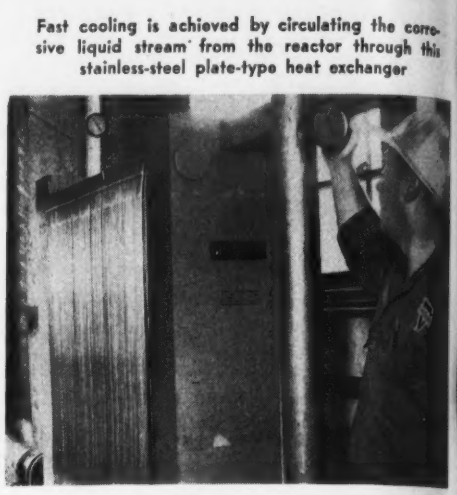
ROTEX®

THE ORVILLE SIMPSON COMPANY... CINCINNATI 23, OHIO

"See our exhibit at the Chem Show"

Check 1694 opposite last page.

Fast cooling is achieved by circulating the corrosive liquid stream from the reactor through this stainless-steel plate-type heat exchanger



Compact, stainless-steel, plate-type heat exchanger performs big job but occupies only little space. Cooling corrosives promptly in a highly exothermic reaction, unit . . .

Deters detergent discoloration during sulfonations

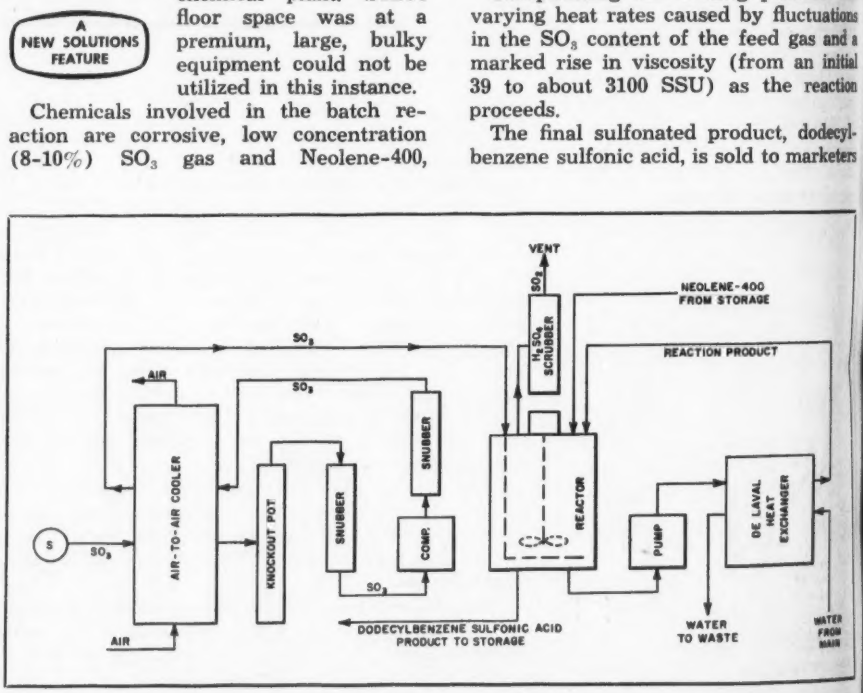
Problem: A rapid, accurate and reliable method of controlling temperature during the sulfonation of a corrosive detergent intermediate was required at Continental Oil Company's Hammond, Indiana, petrochemical plant. Since floor space was at a premium, large, bulky equipment could not be utilized in this instance.

A NEW SOLUTIONS FEATURE

Chemicals involved in the batch reaction are corrosive, low concentration (8-10%) SO_3 gas and Neolene-400, Conoco's trade name for dodecylbenzene alkylate. The reaction proceeds at 125-135°F. It is highly exothermic and excess temperature can quickly cause undesirable discoloration of the product.

Complicating the cooling problem are varying heat rates caused by fluctuations in the SO_3 content of the feed gas and a marked rise in viscosity (from an initial 39 to about 3100 SSU) as the reaction proceeds.

The final sulfonated product, dodecylbenzene sulfonic acid, is sold to marketers



Flow diagram illustrates how heat exchanger (right) fits into overall dodecylbenzene sulfonic acid process at Conoco

of liquid detergents and manufacturers of agricultural products.

Solution: The cooling technique decided upon involves constant recirculation of the material being reacted through a separately located, stainless-steel, plate-type heat exchanger. The liquid stream is moved through the unit by a 300-gpm pump at rates necessary to hold the reaction within the desired 10-degree limit.

City water is used as coolant. Its temperature varies from 55-75°F, depending upon the time of year.

Plate-heat exchangers of this type, because of their sanitary design, have been used in the dairy industry for heating and cooling milk products. They are relative newcomers to the chemical-processing industries. Recent improvements in design, particularly with emphasis on higher operating pressures, have increased the equipment's adaptability.

A major advantage that these units have over conventional tube-and-shell heat exchangers is their ability to provide a large quantity of heat-transfer surface in a very small space. When floor space is limited, this can be an important consideration.

The equipment's design is simple. A stack of corrugated plates, pressed from heavy, corrosion-resistant, stainless-steel stock, serve as heat-transfer surfaces. The plates are supported vertically on a sturdy frame.

Product to be cooled flows through the spaces formed between alternate frames. Heating or cooling medium passes countercurrent to product in adjacent spaces. Both fluids flow through the heat exchanger in the form of relatively thin layers.

The corrugated design of the plates causes high velocity and extreme turbulence, resulting in maximum heat transfer. Liquids cannot leak between plates or mix with the heating or cooling medium. The heat exchanger's sanitary design permits fast "in-place" flush cleaning.

Results: The compact, plate-type heat exchanger helps pro-

CORROSION DATA

20 Selected Results from Service and Laboratory Tests Comparing Ni-Resist with Cast Iron under 400 Different Conditions. Data on comparative service of Ni-Resist in the other corrosive environments may be obtained in the booklet offered below.

Corrosive Medium	Location of Test Specimens	Duration of Test	Temperature °F	Aeration	Velocity	Average Corr. Rates i.p.y. Cast Iron	Ni-Resist**	Type Ni-Resist Preferred
Acetone, 5 parts, and one part Oleic Acid—Linoleic Acid mixture	Separator Tank	131 days	35.6-102 dys. 68.0-150 hrs.	None	None	0.0004	0.00006	1-2
Ammonia, 5-6% by vol.; 150 p.p.m.; Phenol carried by water vapor	Top of phenol tower	309 days	215.6	None	750,000 cu. ft./hr.	0.002	0.0009	1-2
Ammonium, Saturated Sulfate in 3-10% H_2SO_4, plus coke oven gas	Saturator on "Cracker Pipe"	77 days	131	None	Violent	0.08	0.002	1
Calcium Hydroxide (Lime Water)	Laboratory		60	Some	None	0.003	0.0002	1-2
Carbon Dioxide, saturated aqueous solution	Laboratory		60	Some		0.03	0.001	1-2
Coal Tar (High Chloride Content)	Fractionating Column							
	Top	154 days	390	None	Some	>0.2	0.006	3
	Middle	154 days	515	None	Some	0.013	0.001	3
	Bottom	154 days	550	None	Some	0.006	0.003	3
Fertilizer, Commercial "5-10-5" Chemical Fertilizer	In contact with damp granules in storage	290 days	ATM	Some	None	0.010	0.003	1-2
Gasoline (end point containing H_2S & mercaptans plus H_2O. 11-13% chrome steel trays badly corroded)	On top of 24th tray of tower	70 days	370-432	None	Some		0.0027	
Hydrochloric Acid 2%	Laboratory		68			0.88	0.005	1
Paper pulp with small amounts of SO_2, Cl_2, H_2SO_4, pH 4-4.5	Decker effluent	198 days				0.006	0.002	1-2
Petroleum: Crude Oil (reduced, containing 0.584% S)	Bottom of crude tower	290 days	500	None	Turbulent		0.0033	1
Petroleum: Crude Oil (sour, cracked, 0.106% H_2S, & 0.066% mercaptan S)	Top tray or reflux tray of tower	132 days	342-352	None	Gas 26g/m		0.0028	1-2
Sodium Chloride	Salt Brine tank	180 days	50	Considerable	Some	0.010	0.003	1
Sodium Hydroxide 30% plus heavy concentration of suspended salt	Salt tank	82 days	180	Moderate	Moderate	0.0063	0.0001	4
Sodium Phenolate, with 20% (by vol.) tar acids. Total alkalinity of 20% by wt. NaOH	In phenol tower	329 days	248	None		0.002	0.0007	2
Steam condensate with dissolved O and CO_2	In condensate return line	30 days	180	Good	By flow	0.002	0.0004	1-2
Steam	In a nipple expanded pipeline from high pressure steam line	31 days	350	Good	120 lb.	0.002	0.0007	2
Water, brackish, East River, N. Y. C.	Water box of Steam Power Plant	334 days	54	Yes	High	0.010	0.002	1
Water, salt, from oil wells	In salt water pit	217 days	60	Slight	By flow	0.02	0.001	1-2
Water, sea	Intake flume	740 days	ATM	Considerable	5 ft./sec.	0.050	0.002	2

**Consult with Inco for specific corrosion rates for the various types of Ni-Resist.

How Ni-Resist irons "rate" against 20 corrosives

Also possessing excellent mechanical properties, corrosion-resisting Ni-Resist can be specified for a broad range of applications for the toughest service conditions

If you're looking for more satisfactory service life from your fluid handling equipment, you may be surprised by the economies that Ni-Resist* irons have to offer.

That's because Ni-Resist irons — with their Nickel content and austenitic matrix —deliver a unique combination of engineering properties:

They resist corrosion and erosion — they stand up to thermal shock—they have great strength and toughness—they resist metal-to-metal wear.

The unique properties of Ni-Resist irons are cast easily into compressors and blowers, filter drums, kettles and pipe. Ni-Resist irons prolong the life of pump casings, liners, wear rings and impellers. Boost the performance of valves and valve trim components.

In all these applications, Ni-Resist irons deliver the much needed corrosion resistance and mechanical properties. What's more, they *deliver them with cast-metal-economy.*

If the specific media in which you are interested are not given in this list of 20, you can obtain more complete corrosion data by writing us for a copy of "Engineering Properties and Applications of Ni-Resist." A postcard will do it. *Inco Trademark

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street New York 5, N. Y.

Mechanical and Physical Properties of Ni-Resist

	TYPE 1	TYPE 2
Tensile Strength (thousand psi)	25-30	25-30
Thermal Expansion (70-400°F)		
(millionths per °F)	10.7	10.4
(millionths per °C)	19.3	18.7
Magnetic Response	Non-Magnetic	Non-Magnetic
Modulus of Elasticity (million psi) (at 25% of Tensile Strength)	12-14	15-16.2
Hardness, Brinell:		
low chromium	130-170	125-170
high chromium	140-190	140-190
Toughness (Izod Impact Test) (foot-pounds) 1.2 arbitration bar unnotched—struck 3" above supports.	100	100
Machinability	Good	Good

NI-RESIST

NICKEL MAKES IRONS PERFORM BETTER LONGER

"See our exhibit at the Chem Show"

Check 1695 opposite last page.

VACUUM

THE RIGHT PUMP
THE RIGHT PRICE

Type SWMH
Water cooled
high-duty oiling.

Type SAMG
Air cooled,
high-duty oiling.

Type SAML
Air cooled,
high-duty oiling.

Write for
bulletin giving full
specifications.

Dependable, automatic service year in—year out is standard Lammert service. Capacities 4.3 to 225 cfm. Medium to high vacuum (up to 20 microns of barometer).

LAMMERT & MANN CO., INC.
1753 Walnut Street, Chicago 12, Illinois, SEeley 3-0383

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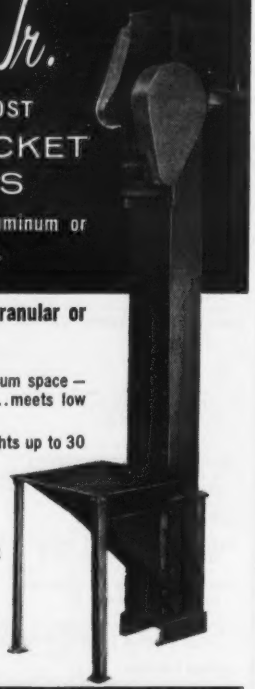
Bucketlift Jr.

COMPACT, LOW COST
VERTICAL BUCKET
ELEVATORS

Stainless steel, galvanized, aluminum or all steel construction.



Handles up to 15,000 lbs. of granular or powdered material per hour!

- Compact construction takes minimum space — fits into tight machinery layouts...meets low headroom requirements.
- Bucketlift is self-supporting — heights up to 30 feet high.
- Easy to feed, low loading height reduces job fatigue, increases efficiency.
- Removable panel for easy cleaning or inspection.

A Bucketlift Jr. Vertical Bucket Elevator can help solve your material handling problem at low cost. Call or write for information.

M-H STANDARD CORPORATION
515 Communipaw Ave., Jersey City 4, N. J., HE 3-5834

Check 1697 opposite last page.

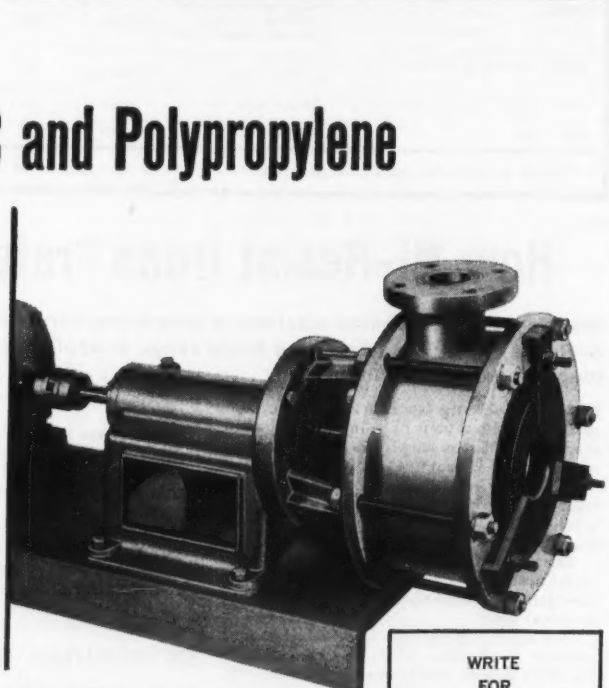
Corrosion Resistant Centrifugal Pumps in PVC and Polypropylene

To Handle HCL, H_2SO_4, Most Acids Plating Solutions and Many Solvents

Wetted parts are constructed of unplasticized, unmodified polyvinyl chloride or Polypropylene. These pumps offer the widest possible range of corrosive resistance, as well as the non-contaminating transfer of sensitive solutions.

A complete line of Vanton Centrifugal pumps is available with capacities 10 through 180 GPM, discharge heads to 160 feet. They cost less and last longer than many special alloy pumps used in similar service applications.

Ruggedly constructed, engineered for efficiency, they have mechanical shaft seals of the latest design in a range of materials to cover all corrosive applications.



WRITE
FOR
SPECIFICATIONS
INFORMATION

VANTON PUMP & EQUIPMENT CORP.
DIVISION OF
COOPER ALLOY CORPORATION • HILLSIDE, NEW JERSEY

VP-105

"See our exhibit at the Chem Show"
Check 1698 opposite last page.

vide the precise temperature control needed to insure the output of a light-color uniform-quality sulfonated product at Conoco. Measuring only 6 x 3 x 6′ high (excluding carrying bar extensions), the unit occupies less than one-quarter the space that would be needed by a conventional tube-and-shell heat exchanger having equal cooling capacity.

On stream since December 1957, the equipment has never become fouled and has virtually required no maintenance. (It has been pulled apart only once for a routine inspection.) The stainless-steel plates are satisfactorily resisting attack from the corrosive chemicals. Preventive maintenance consists of an occasional flushing with water.

(Further information about plate-type heat exchangers may be obtained from The De Laval Separator Company, Poughkeepsie, New York.)

Check 1699 opposite last page.

NEW LITERATURE
Corrosion Control

Selecting the right gasket material is discussed in 24-page catalog. Resistance ratings for 22 different materials are summarized in three pages of tables. Over 100 chemicals are listed. The literature also points out common faults in gasket design and presents suggested remedies. Booklet AD-190 — Garlock Inc.

Check 1700 opposite last page.

Plastic-lined "Y" valves are depicted in two-page bulletin. Units are designed to control the flow of hazardous, corrosive and erosive fluids. Wetted parts are protected with either Penton, Kel-F or Halon. Dimensions and other technical data are included. Bulletin "Plastic-lined Valves" — The Wm. Powell Company.

Check 1701 opposite last page.

How American Cyanamid solved corrosion problems on exterior of tanks is revealed in one-page folder. Vessels are now coated with an all-vinyl system. Photographs of H_2SO_4, brine and propane storage tanks are shown. Data Sheet "American Cyanamid" — Carboline Company.

Check 1702 opposite last page.

Stainless-steel processing vessels are considered in 44-page brochure which also describes overall scope of manufacturer's activities. Illustrations of wide range of equipment for petroleum, chemical and other processing fields are included. PDM Brochure — The Pittsburgh-Des Moines Steel Company.

Check 1703 opposite last page.

Polyethylene fume and dust scrubbers are detailed in four-page brochure. Specifications, construction details, operating characteristics and current prices are listed. "Polyethylene Fume and Dust Scrubbers" — American Agile Corporation.

Check 1704 opposite last page.

Simulated sea salt mix for performing accelerated corrosion studies is described in technical data sheet. Product is granular and colorless and has particles no larger than will pass a 24 mesh screen. Tech Bul "Sea-Rite" Salt — Lake Products Company, Inc.

Check 1705 opposite last page.

Teflon products and fabricating services are reviewed in eight-page bulletin. Seal rings, O-rings, packings, extrusions and other machine parts are reviewed. Properties of molded Teflon are shown in full-page table. Bul R3017 — Allegheny Plastics, Inc.

Check 1706 opposite last page.

Molybdenum metallurgical literature available from manufacturer is described in six-page listing. Over 100 bulletins pertaining to the subject are cited. Molybdenum Metallurgical Literature Bul — Climax Molybdenum Company, division of American Metal Climax, Inc.

Check 1707 opposite last page.

Technical and specification data of centrifugally-cast, thermoset-epoxy resin, glass-fiber reinforced pipe is presented in 16-page book. Included are numerous tables showing chemical-resistance. Fibercast Spec Data — Fibercast Company, Division of The Youngstown Sheet and Tube Company.

Check 1708 opposite last page.

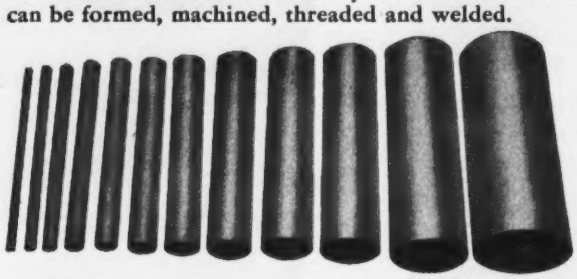
Soviet research on corrosion of special alloys is discussed in 143-page report. Data compiled confirms that the Soviets employ sound theoretical principles and are abreast of latest Western developments in the corrosion control area. To obtain report 61-31480, remit $2.75 direct to Office of Technical Services, United States Department of Commerce, Washington 35, D. C.

Van-Cor®

THE ANSWER TO CORROSION PROBLEMS

WHAT IS VAN-COR? Van-Cor is rigid unplasticized polyvinyl chloride. Available in two types: Van-Cor 1—*Normal Impact* and Van-Cor 2—*High Impact.*

ADVANTAGES OF VAN-COR—Van-Cor is highly resistant to corrosion by hundreds of industrial acids and alkalies. Van-Cor is light in weight (½ that of aluminum). Van-Cor has high tensile strength and low flow resistance. Van-Cor is easily installed because it can be formed, machined, threaded and welded.



VAN-COR PIPE—Diameter sizes from ¼″ thru 12″. Available in 10 ft. or 20 ft. lengths.

VAN-COR FITTINGS—Sizes from ¼″ thru 12″. Includes: threaded fittings, socket fittings, flanged fittings, belled fittings and special fittings.

VAN-COR VALVES

Sizes from ½″ thru 3″. Types include diaphragm valves, plug valves, lift check valves, ball check valves, ball valves, and Walworth "Y" globe valves.

VAN-COR SHEETS

Thicknesses range from 1/32″ thru 2″. Sheet stock size is 48″ x 96″. Transparent on special order.

VAN-COR EXTRUDED 90° ANGLES

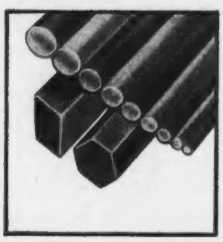
Sizes: 1½″ x 1½″ x 3/16″ and 2″ x 2″ x ¼″. 10 ft. lengths.

* * * *

TUFTITE® PVC pipe is unaffected by sewage or harmful soil conditions. Will not break in storage, installation or use. Roots cannot penetrate Tuftite's bonded joints. Lightweight; easily installed. Tuftite is available Plain or Perforated, 2″ thru 6″ diam., 10′ or 20′ lengths. Tuftite fittings are also available.

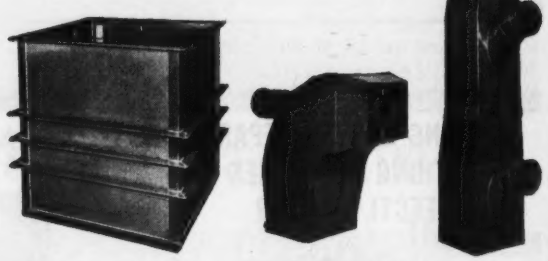
VAN-COR JOINING STRIPS

For connecting PVC stock by solvent welding. 90° joining strips for corners, H strips for a single plane. For sheet gauges of 1/8″, 3/16″, ¼″. 10 ft. lengths.



VAN-COR BAR STOCK

Round bars, ¼″ thru 2″ diam. in 10 ft. lengths. 2½″ thru 4″ in 5 ft. lengths. Hexagonal bars, 7/16″ thru 2″ in 10 ft. lengths.



VAN-COR CUSTOM FABRICATIONS

Colonial will fabricate to your specifications hoods, tanks; ducts, tank linings, etc.

OTHER FORMS—Van-Cor is also available in Welding Rods, Bolts and Nuts, Extruded Seamless Duct, Fabricated Duct, and Custom Extrusions.

VAN-COR CATALOG

Request complete catalog containing detailed specifications, diagrams, flow charts, chemical resistance tables and installation data.

Engineering Service Available

INDUSTRIAL DIVISION OF

COLONIAL PLASTICS MFG. CO.

Subsidiary of the Van Dorn Iron Works Co.

2685 EAST 79TH STREET • CLEVELAND 4, OHIO

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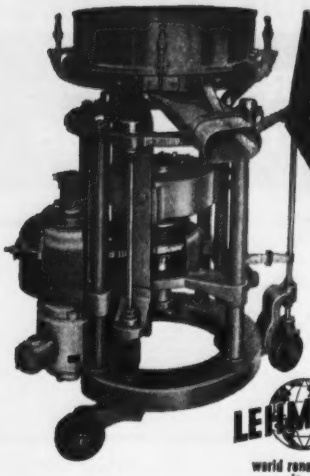

The Lehmann VORTI-SIV. Compact, versatile, portable. Easily moved on its casters from one location to another as required.

LEHMANN Vorti-Siv multiplies production per foot of floor space

The extraordinary capacity of the VORTI-SIV, which *occupies only 4 square feet of floor space*, enables it to outproduce other types of screening machines occupying many times that amount of space. It MULTIPLIES throughputs because it is the only whirlpool type screening machine with adjustable amplitude and speed. Screens powders, liquids, slurries in 4 to 400 meshes. Practically non-blinding. Meshes quickly changed. Fast clean-up. Write for full information and a free trial run of your product in our plant or contact the Lehmann distributor nearest you.

LEHMANN ®
world renowned in processing machinery

J. M. LEHMANN COMPANY, Inc., Lyndhurst, N. J.

or

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Chas. L. Burks & Co. Post Office Box 1666 High Point, North Carolina	Harry Holland & Son, Inc. 10600 Puritan Avenue Detroit 38, Michigan	Geo. E. Missbach & Co. 3330 Peachtree Road, N.W. Atlanta 5, Georgia	Wm. B. Sanford, Inc. 601 West 26th Street New York, New York
Duncan Equipment Co. 506 Broadway Seattle 22, Washington	F. W. Kamin Co. 14714 Detroit Avenue Lakewood 7, Ohio	Morton-Myers Co. 220 E. Missouri Avenue Kansas City 6, Missouri	Webster Equipment Co. 549 W. Randolph St. Chicago, Illinois

Sada y Himes S.A., Apartado 911, Padre Mier 1250 Pte., Monterrey, N.L., Mexico

See our advertisement in Chemical Engineering Catalog

"See our exhibit at the Chem Show" Check 1710 opposite last page.

USING SCREEN SEPARATIONS? NOTHING CLASSIFIES AS PERFECTLY AS AIR

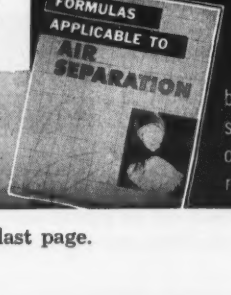
Several desirable territories open for distributors

GAYCO CENTRIFUGAL AIR SEPARATORS

Classify practically all dry fine materials

You get:
- CLOSER SEPARATIONS
- IMPROVED PRODUCTION
- NO UNDESIRABLE OVERSIZE.

RANGE 60 to 400 mesh.
Timken bearings.
Choice of Standard or Heavy-Duty Models.



this helpful booklet sent on request

Robert M. Gay Division
UNIVERSAL ROAD MACHINERY CO.
117 Liberty St., New York 6, N. Y.
Factory and Laboratory: Kingston, N. Y.
In Canada: Watson-Jack Hopkins Ltd., Montreal

Check 1711 opposite last page.

Impact mill processes 1100-lb batch of dry mix in minutes

One mill does the work of seven

Impact-type unit grinds 1100 lb of dry paint mix in minutes — slashes power, maintenance and labor costs, while cutting floor space needs more than 90 percent

TED F. MEINHOLD, Associate Editor
with **ROBERT L. HENRY,** President
U. S. Protective Coatings, Inc., Baltimore 2, Maryland

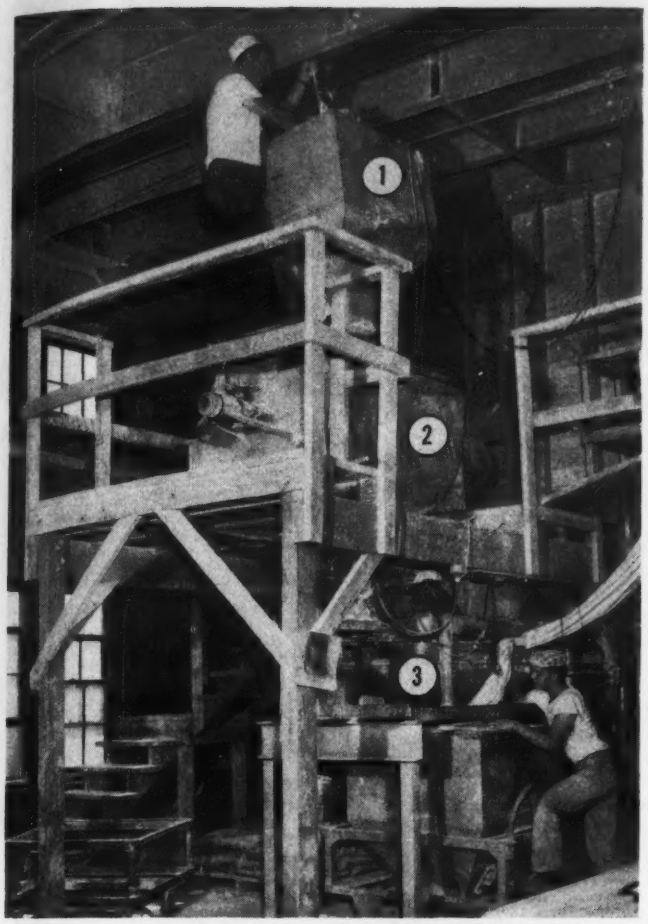
Problem: Grinding and blending dry ingredients for masonry paints was a costly and time-consuming operation at U.S. Protective Coatings, Inc., Baltimore, Maryland. Besides occupying an excessive amount of valuable floor space, the seven conventional ball mills (six four-foot diameter, one eight-foot diameter) used for the purpose were slow, noisy and difficult to operate and clean. The last was an especially annoying problem when color changes were made between batches.

A NEW SOLUTIONS FEATURE

It took mill operators from one to three hours to process an 1100-pound batch of dry mix. The company's products are designed to meet the rigid requirements of Federal specifications TT-P-21. A typical formulation consists of the following major ingredients:

Percent by Weight

Ingredient	Min	Max
White reground Portland cement	80.0	93.5
Lime	0.0	5.0
Carbonates (introduced with others)	0.0	3.0
Water repellants (calcium or aluminum stearates)	0.5	1.0
Hygroscopic salts (calcium or sodium chloride)	3.0	5.0
Titanium dioxide	3.0	5.0



Hopper at top (1) transfers product into ribbon blender (2), which feeds cone-shaped centrifugal mill (3)

Solution: When the plant moved into its new quarters in 1959, the seven mills were replaced by a single, high-speed, impact-type machine. Powered by a 20-hp motor, the mill develops a powerful centrifugal action which causes every particle of material to be thoroughly processed, thereby giving complete and uniform dispersion in the final product.

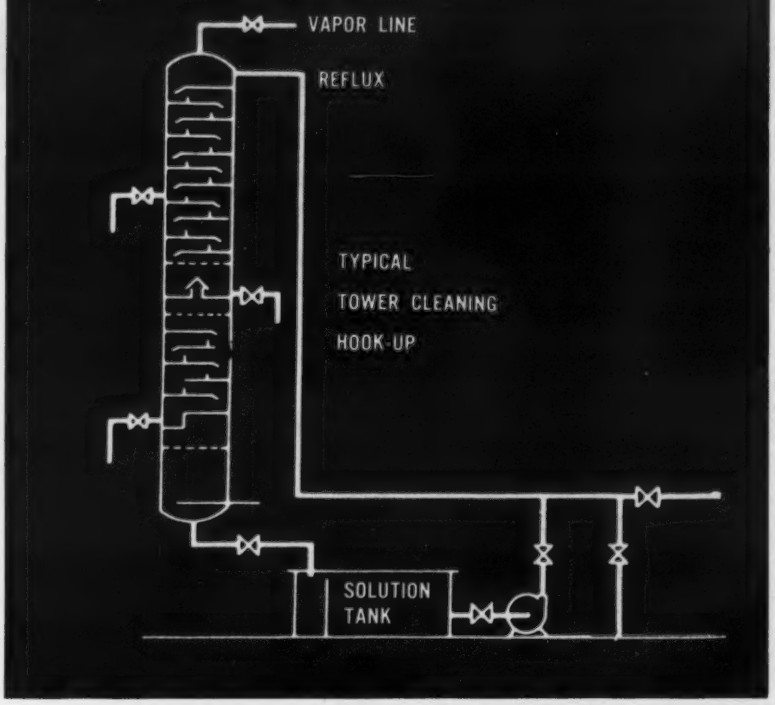
Key component in the unit is a 24"-diameter rotor spinning at 3000 rpm. The device consists of two steel discs spaced about one inch apart by specially-designed, hard-coated impactors. Material being processed is thrown out, by centrifugal force, against walls of the grinding chamber. All nodules or clusters in the mix are broken up into an intimate, smooth-textured, blended product.

The conical-shaped machine occupies a space 68½ inches high, 65 inches long and 28 inches wide. Total weight is about 1200 pounds. Construction is basically carbon steel. Rotor-wear plates and rotor and liner impactors are coated with tungsten carbide to protect against abrasion.

Sequence of operations at the plant are as follows: First, the proper proportions of each ingredient are weighed and dumped into a mobile mixing hopper. This is then wheeled into position over a ribbon-type pre-mixer where materials are mixed for 25-30 minutes.

Upon the conclusion of the

Another job done better through OAKITE ECP*
Engineered Cleaning Program



Processor gets a tall still shining clean... chemically

Oakite Engineered Cleaning Programs give a good example of applied chemistry. It puts chemicals to work for the more efficient, faster, lower cost in-place cleaning of towers, stills, and other processing columns. Results stand out.

In one 40-foot trichlorethylene still, for instance, a thick, spongy carbon deposit saturated with HCL piled up on trays and bubble caps. It impeded flow. Efficiency fell. Former methods of cleaning never proved satisfactory.

The Oakite-engineered method indicated the following chemical treatment: A solution of Oakite 77 was pumped into the bottom of the column, passed through an exchanger to heat it, then circulated top to bottom for four hours. A clear rinse followed. Then water heated and agitated with steam boiled in the still for an hour before final dumping.

Then two top inspection plates were lifted, trays and bubble caps actually shone. Remarked the general foreman: "Amazing—I never thought it could be cleaned chemically."

*Oakite ECP stresses chemical cleaning. Because of the diversity of problems in the processing industries, it is organized and planned as a cooperative effort with the plant engineer. He provides the intimate knowledge of the columns, processing functions, hook-ups, soil and water conditions. The Oakite man applies his technical experience, draws on over 170 cleaning materials, up-to-the-minute methods, and has one of the finest laboratories devoted to cleaning research to consult on unusual and difficult soil problems. The program engineered from all this gives specific details, outlines procedures, gets results. Write for bulletin F-10822. Oakite Products, Inc., 16H Rector Street, New York 6, N. Y.

OAKITE
over 50 Est. 1909 SCIENCE
years' leadership in industrial cleaning

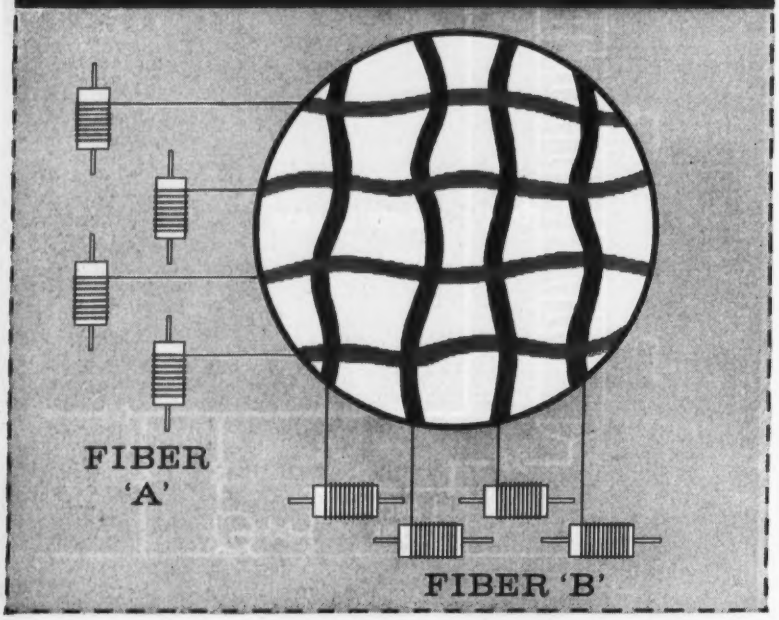
"See our exhibit at the Chem Show"

Check 1712 opposite last page.

FOR IMMEDIATE RELEASE

COMBINATION FABRICS

created for the TOUGHEST filtration problems!



SUPERIOR ABRASION RESISTANCE, GOOD CAKE PICK-UP AND RELEASE

Now NFM blends a combination of required performance qualities into custom fabrics to fit any specific filtration process. *Example:* for rugged strength and easy cake discharge, we take smooth filaments of linear polyethylene or PVC as the warp, and weave them with filling yarns of spun or staple dynel or orlon for good cake retention. The variety of available hyphenates (PVC-dynel, linear polyethylene-dynel, linear polyethylene-orlon, and similar combinations with polypropylene) permits the looming of fabrics to any desired formula of tensile strength, abrasion resistance, heat tolerance, chemical resistance, cake retentivity and release. This flexibility in combining yarn characteristics means you can specify an NFM cloth that answers your difficult filtering problem most efficiently and economically.

Tell us your application, we will send you samples

Weavers of Industrial Filter Media for over Fifty Years

NFM NATIONAL FILTER MEDIA *Corporation*

General Offices and Mills: New Haven 14, Conn.; Western Office and Factory: Salt Lake City 10, Utah, Sales Offices—Representatives: Atlanta, Ga., 990 Lindridge, N.E.; Cleveland 39, Ohio, P.O. Box 9407; Monterey Park (L. A. area) California, 664 Monterey Pass Road; Chicago, Ill., 6034 N. Cicero Avenue; Houston, Texas, 1607 Jefferson Avenue; Toronto, Ontario, C.P.R. Roadway, 1119 Yonge Street.

Check 1713 opposite last page.

pre-mix cycle, product is fed by means of a vibrating chute directly into the impact mill. Processing time through the machine is only 10-15 minutes. Dry-blended material leaving the mixer is received in the hopper and rolled to the bagging machine.

For some colors, the mix must be passed twice through the mill. Total elapsed time (including dumping, handling, charging, etc.) in such cases is 45 minutes.

At the bagging station, product is packaged in either 5-, 25- or 50-pound containers.

Results: The single, high-speed impact mill is satisfactorily handling the production load that the seven units previously did. Overall processing time per batch for most formulations has been cut at least 50 percent. Quality has also improved. Color intensities are greater — even though the blending cycle has been reduced.

Floor-space requirement for the milling area is only about 10% of what it used to be with the old machines. Power savings are also considerable. Housekeeping has been simplified. It is no longer necessary to shut units down for long periods of time when switching colors.

Color change can be made by simply removing the head of the unit and cleaning the interior with a vacuum cleaner and brushes. This takes less than an hour.

Maintenance has not been a problem. No replacement of wear parts has been required since the machine was placed in operation nearly two years ago.

(Further information about Entoleter centrifugal mixers may be obtained from Entoleter, Inc., subsidiary of American Manufacturing Company, Inc., P. O. Box 904, New Haven 4, Conn.)

Check 1714 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

in One Operation

abbé

DISPERSALL MIXER

The Abbé Dispersall Mixer disperses, mills and blends (as well as emulsifies) in ONE operation. Solid ingredients are *completely* dispersed in a fraction of the time required by conventional mixers. Eliminates pre-milling and pre-mixing.

The Abbé Dispersall Mixer gives you speed and power, plus the tremendous advantage of easy cleaning in changing from one product to another. Tooth pastes, ointments, paints, colors and pharmaceuticals, etc., are mixed and dispersed better and faster in the Abbé Dispersall Mixer in a ONE-stage operation. Write for Catalog 78.

abbé ENGINEERING CO.
620E GRAYBAR BLDG., NEW YORK 17, N. Y.
Designers and Manufacturers of
Ball, Pebble and Jar Mills • Pulverizers
Sifters • Cutters • Mixers

Check 1715 opposite last page.

This is Your Guide To The 28th Exposition

This is Your Guide To The 28th Exposition of Chemical Industries

TEAR OUT HERE

OPERATING MANAGEMENT'S OWN MAGAZINE . . .

CHEMICAL PROCESSING

PART TWO/NOVEMBER 1961

28th EXPOSITION OF CHEMICAL INDUSTRIES

NEW YORK COLISEUM

NOV. 27–DEC. 1 1961

DIRECTORY and GUIDE

INDEX:

Chem Show Hits Hard at Rising Costs ... 76-77
Company Directory ... 78
Product Guide ... 102
Complete Floorplans ... 115-121

EXPOSITION HOURS

Monday	12 Noon to 10 PM
Tuesday, Wednesday	10 AM to 6 PM
Thursday	10 AM to 10 PM
Friday	10 AM to 6 PM

Operating *Management people search for cost saving ideas*

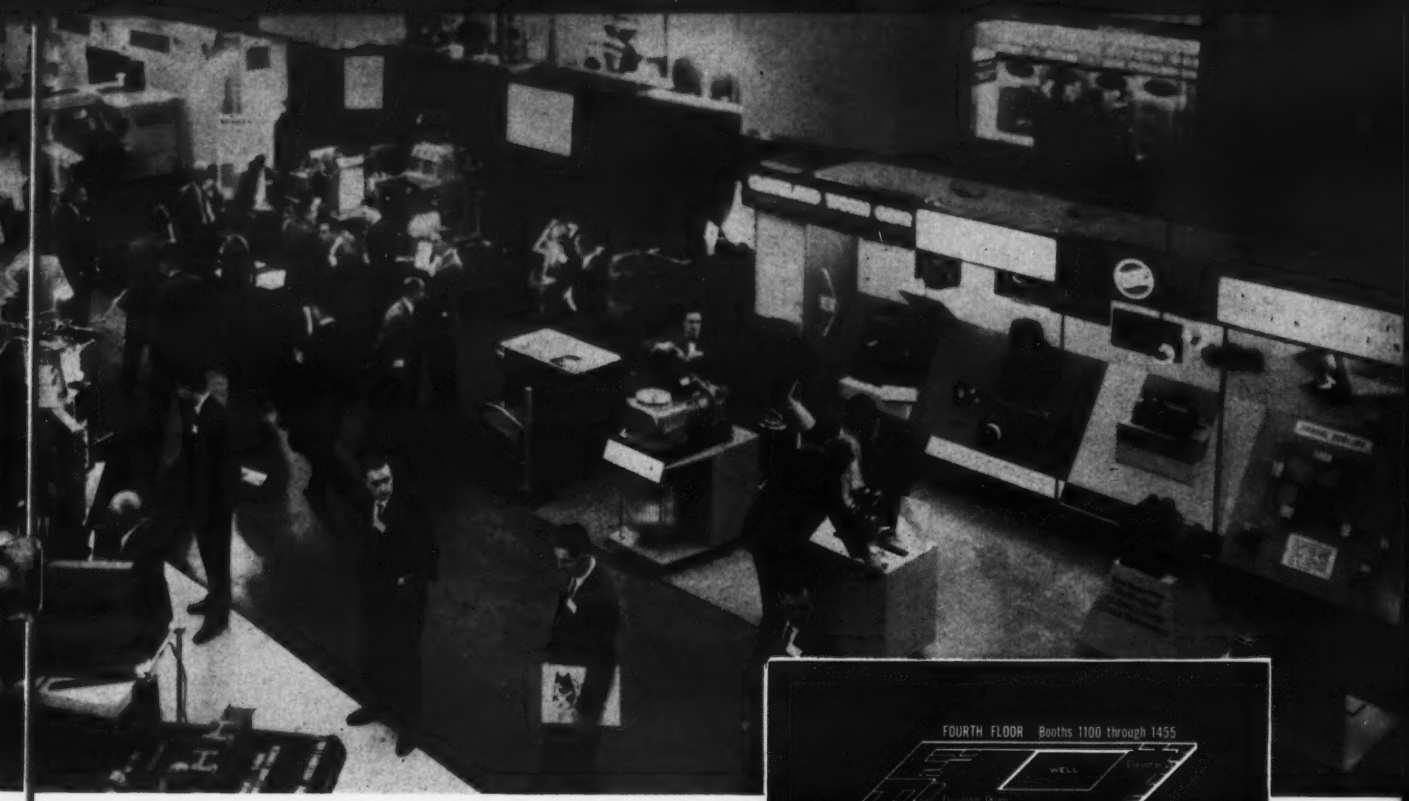
Chem show exhibits hit hard

Full impact of the two year pitch battle Operating Management men have been waging with rising costs will clearly be in evidence at the 28th Exposition of Chemical Industries, The Coliseum, New York, November 27 to December 1. Improved techniques, advanced equipment, new raw materials and intermediates on display will sharply outline progress along the path to increased production at lower cost that industry is so actively following. This Exposition, more than any other, will have a climate favoring studies of manufacturing economy through improved formulations and shortcut procedures. Particular attention will be drawn to equipment that combines, or even eliminates, intermediate processing steps.

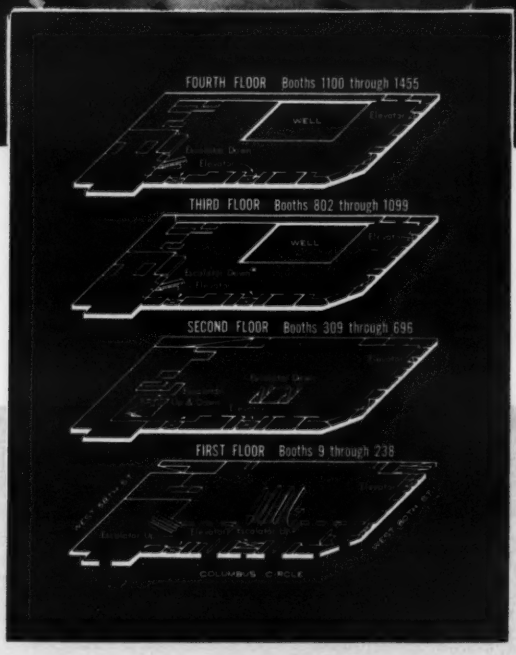
Expected to be the largest ever held, this year's Exposition will have more than 500 exhibits spread over four floors. Special sections will be devoted to laboratory equipment and supplies as well as to chemical intermediates and raw materials.

Certainly this vast array of equipment will present a formidable challenge to the Operating Management man intent on finding the cost saving ideas most important to his own operation. We want to help.

This Directory & Guide is edited to help you find the items of most interest to you quickly and easily. In addition to an alphabetical Directory of all show exhibitors, we have prepared a comprehensive Product Guide. All companies exhibiting equipment, chemicals, or offering services for a particular function are entered under the appro-



at rising costs


FOURTH FLOOR Booths 1100 through 1455
THIRD FLOOR Booths 802 through 1099
SECOND FLOOR Booths 309 through 696
FIRST FLOOR Booths 9 through 238

priate category in order, by booth number. This way your progress through the show can avoid backtracking and floor hopping, saving a lot of valuable time.

As a further aid to you in obtaining the most from your show visit, we have gleaned from the multitude of products a few of the high spots. You will find these written up in some detail throughout this issue of CHEMICAL PROCESSING magazine, in the appropriate sections. They'll be tagged for easy identification.

So, happy hiking during your visit to the Exposition. If you have a question, or want to talk over some phase of CP's service to Operating Management, drop in. We'll be in booth 880, on the third floor.

Here's how to use this guide

Take this insert along with you when you head for New York. Check through the Company Directory (page 78) and Product Guide (page 102) as you travel . . . or in your hotel room. Note the booths you want to visit and jot down the company name and product right on the floor plans (pages 116 through 121); they've been made large enough.

This way, you can pre-chart your course through the hall . . . make your coverage more efficient . . . and save your feet.

COMPANY DIRECTORY

Complete floor plans on pages 116 to 121

A Complete List of Exhibitors in Alphabetical Order
Advertisers in this issue of CHEMICAL PROCESSING
are indicated by bold face type

A

Name of Exhibitor	*Booth No.*
ACF Industries, Inc.	
ACF Electronics Division	**1353**
W-K-M Division	**847**
A.P.V. Company, Inc.	1303
Paul O. Abbé Inc.	**49**
Abbott Laboratories	918
R. P. Adams Company, Inc.	836
Aero Supply Manufacturing Co.	
L. J. Wing Mfg. Co.	1094-96
The Air Preheater Corp.	1104-06
Allis-Chalmers Manufacturing Co.	
Industries Group	**636**
Alloy Products Corp.	**1205**
Alloy Steel Products Company	**22**
Alsop Engineering Corporation	**381**
Aluminum Company of America	474
Chemicals Division	470
American Air Filter Co., Inc.	676
American Chemical Society	410
News Service	
American Chemical Society	406
American Electric Power	1126
Service Corp.	
American Heat	1058-60-62
Reclaiming Corp.	
American Hydrotherm	1174-76
Corporation	
American Institute of Chemical	1219
Engineers	
American Instrument Co., Inc.	445
American Machine	
and Metals, Inc.	456-506-556
De Bothezat Fans Division	
Filtration Engineers Division	
Niagara Filters Division	
Tolhurst Centrifugals Division	
American Manufacturing Co.,	590
Inc., Entoleter, Inc.	
American-Marietta Co.	**632**
Pulverizing Machinery Company	
American Meter Company, Inc.	**150**
Pump Division	
American Plant Equipment Co.	
Pronto Filters Div.	1282-1284
American-Standard, Controls	
Division	1068
American Sterilizer Company	385
Scientific and Industrial Div.	
American Tool and Machine Co.	862
Ampco Metal, Inc.	412
Analytical Chemistry	86-410
Analytical Measurements, Inc.	395
The Anchor Packing Co.	1173-1175
Angola Alloy Fabricators, Inc.	**1341**
Ansul Chemical Company	95
Appareils Gachot	1081
Armco Steel Corp.	1221-1223
Armco Division	
Armstrong Machine Works	**1359**
Richard M. Armstrong Co.	927
Arrowhead & Puritas Waters,	
Inc.	1085
Artisan Industries, Inc.	874
Atomic Energy of Canada Ltd.	1150
Commercial Products Div.	
Autoclave Engineers Sales Corp.	346
Automatic Switch Co.	984-986
Automotive Rubber Co., Inc.	802-804

B

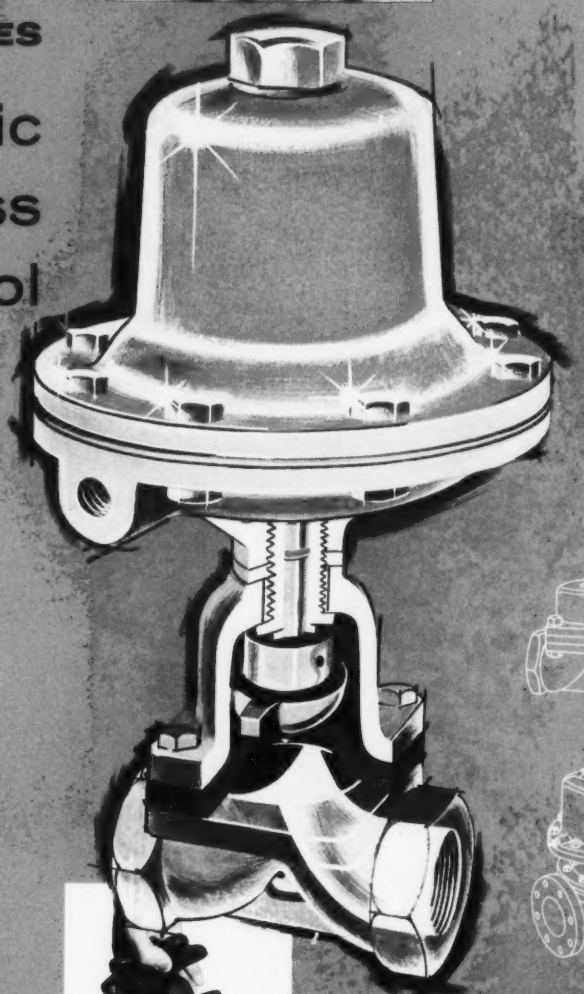
Babcock & Wilcox Co.	1002-04-06
Tubular Products Div.	
Bailey Meter Company	610
Baker Perkins, Inc.	560-609
Chemical Machinery Div.	
Barco Manufacturing Company	439
Industrial Aircraft Div.	
Barnebey-Cheney	52
Barnes & Jones Inc.	**1439**
Barnstead Still and Sterilizer Co.	416
Bartlett-Snow-Pacific, Inc.	**569**
The Bastian-Blessing Company	1122
Rego Division	
Bauer Bros. Co.	**1430-1431**
Beckley, Haltom & Hickman	
Services Corp.	1363
Beckman Instruments, Inc.	333
Scientific & Process	
Instruments Div.	
Beemer Engineering Company	1416
Bel-Art Products	**937**
Bell International Corp.	**193**
Wheelabrator Corp., Div.	
Bemis Bros. Bag Co.	**164-166**
Bench Scale Equipment Co.	1405
Benson Laboratories, Inc.	1381
Bethlehem Corp.	1426-1428
Bethlehem Foundry & Machine	
Division	
Process Equipment Division	
Biach Industries, Inc.	1253
Bird Machine Company	559
Bishop & Co.	936-938
Platinum Works	
Black Products Company	1319
Black, Sivalls & Bryson, Inc.	685
Blackstone Corporation, Majac	1087
Inc., Subsidiary	
Blaw-Knox Company	**581**
Buflovak Equipment Div.	
Chemical Plants Division	
S. Blickman, Inc.	309
Bowen Engineering, Inc.	706
Bowser, Inc.	1166-68-70
Process Filters Div.	
Brabender Corporation	390
Brabender Instruments, Inc	340
Norman Bragar Co., Inc.	1228-30-32
Bramley Machinery Corp.	187
Branson Instruments, Inc.	325
Brinkmann Instruments, Inc.	360
Brookfield Engineering Laboratories,	
Inc.	885-887
Brooks Instrument Company Inc.	998
Browne-Morse Company	336
Laboratory Furniture Div.	
Carl Buck & Associates	1083
The Bucket Elevator Company	**1038**
Buchler Instruments, Inc.	369
Buell Engineering Company,	
Inc.	**1189-93**
Buffalo-Eclipse Corp.	
Penberthy Manufacturing Co.,	
Division	1200
Buffalo Wire Works Company, Inc.	1229
Burling Instrument Co., Inc.	9
The Burnet Company	1442
Production Equipment Inc., Div.	
Butler Manufacturing Co.	**1161**
Butterworth, Inc.	920-922

you can see the sense to

HILLS-McCANNA

DIAPHRAGM VALVES

for automatic and remote process flow control



Here is economy . . . simplicity . . . reliability . . . accuracy for even your most difficult applications

WIDE RANGE OF AIR OPERATOR SIZES—no need to buy more operator than needed for a given size valve.

DRIPTIGHT SHUTOFF—will close tightly even against solid particles in the line.

ACCURATELY CONTROLLED THROTTLING — valves available with positioning devices for consistently reproducible control accuracy.

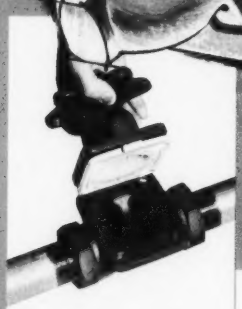
TYPES FOR EVERY JOB—including air open—air close, air open—spring close, and spring open—air close operation.

WORKING PARTS completely isolated from flow.

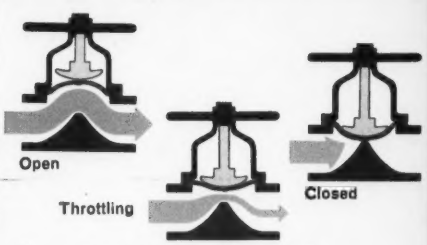
BODY AND DIAPHRAGM MATERIALS to handle paper pulp, acids, alkalies, oils, foods, beverages, fats, slurries, semisolids, viscous materials, compressed air, gases, volatiles, atomic reactor wastes, fuels, and hundreds of other fluids.

1/2" THROUGH 16" VALVE SIZES—with screwed, flanged, socket weld, and special end connections—for pressures to 150 psig and temperatures to 400° F.

ASK FOR NEW BULLETIN NO. 134-A giving complete selection data. Write for your copy today or call your nearby Hills-McCanna distributor.



Valves can be serviced without removing body from the line.



Accurate control plus bubble-tight closure even against solid particles which might lodge on valve seat. No packing—no leakage around stem.

HILLS-McCANNA COMPANY

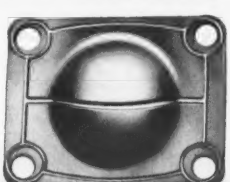
400 MAPLE AVENUE, CARPENTERSVILLE, ILLINOIS

Hills-McCanna (Canada) Ltd, 920 Matthews Avenue, Summerville (Toronto), Ontario

Valves and parts stocked nationwide by leading industrial distributors.

What these valves really control is cost!

Tough, resilient diaphragms available in a wide range of elastomerics and plastics, including Chlorobutyl and solid Teflon.



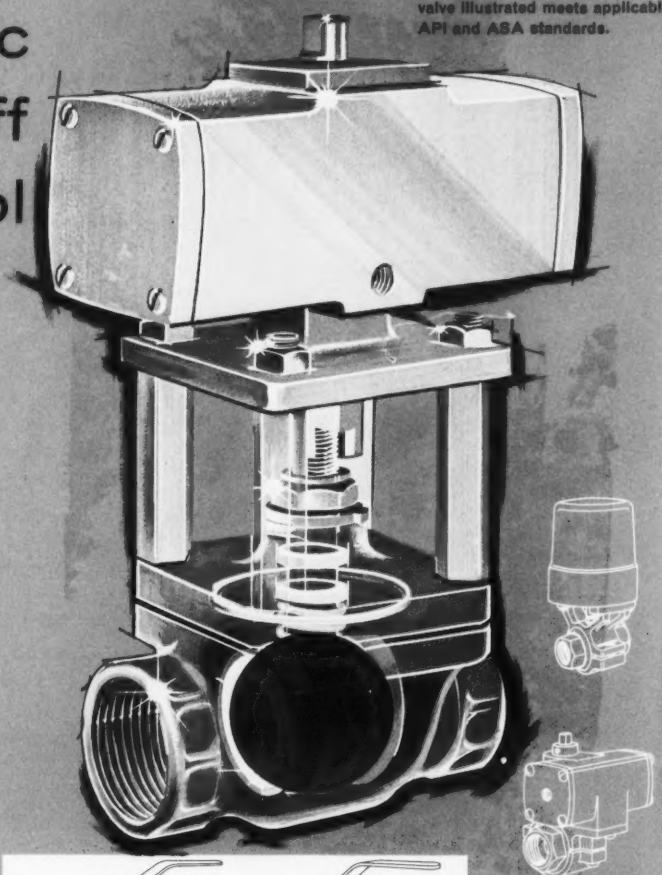
you can see the sense to

HILLS-McCANNA

BALL VALVES

for automatic and remote on-off control

McCANNASEAL® top-entry valve illustrated meets applicable API and ASA standards.



The only ball valves for service from -150° F to 1000° F

One look at a Hills-McCanna ball valve with pneumatic or electric operator tells you why it is a natural for remote flow control:

QUARTER-TURN OPERATION—permits use of a simple, economical, quick-acting operator.

LEAKTIGHT—line pressure forces closed ball tightly against downstream seat. Stem sealing is solved by twin seals illustrated below.

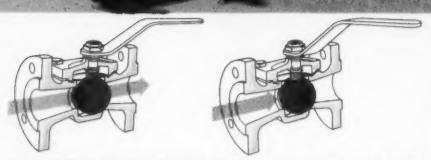
REMARKABLE VALVE WEAR LIFE because of smooth non-abrading contact between metal ball and nonmetallic seats.

1/4" THROUGH 12" SIZES—screwed, socket weld, flanged ends . . . pressures from 10^{-5} mm Hg to 1000 psig . . . temperatures from —150° F to 1000 F° . . . wide range of body materials for corrosive and noncorrosive services. "Fire-Seal"® seats available for leaktight closure under excessive temperatures.

PNEUMATIC OPERATORS—optional accessories include a solenoid valve for electrical control, limit switch for remote on-off operation, and a fail-safe device to return valve to open or closed position in event of air system failure.

ELECTRIC OPERATORS—weatherproof, explosionproof, rugged, and reliable.

SEND TODAY FOR NEW 32-PAGE CATALOG giving complete specifications and service recommendations for Hills-McCanna ball valves—manual and motor operation.



QUARTER-TURN OPERATION; low pressure drop. When the big, round, turbulence-free orifice is in line with the pipe, valve is wide open. A quarter-turn closes it completely against flow in either direction.

HILLS-McCANNA COMPANY

400 MAPLE AVENUE, CARPENTERSVILLE, ILLINOIS

Hills-McCanna (Canada) Ltd, 920 Mattawa Avenue, Summerville (Toronto), Ontario

Valves and parts stocked nationwide by leading industrial distributors.

What these valves really control is cost!

NO FLOW LEAKAGE—line pressure forces closed ball tightly against the downstream seat. The seat seals against the valve body.

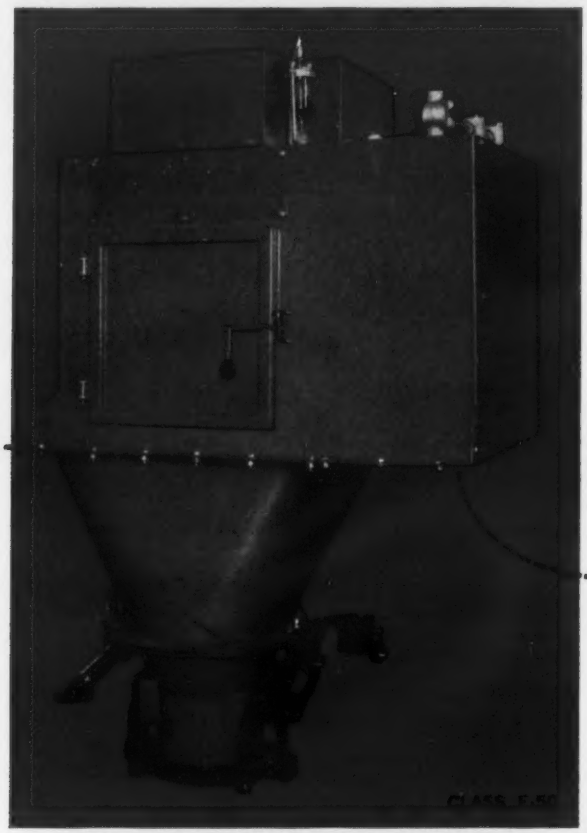
"WEDGE-SEAT" DESIGN of McCanna-seal valve compensates for wear—ball and seats are continuously wedged down into body under pressure of long-lived, corrosion-resistant, nonflexing, nontorsional spring.

STEM SEALING IS SOLVED—two seals are under compression by the stem nut which can be tightened to compensate for wear. Lower seal is back-seated—line pressure works with it to prevent leakage.

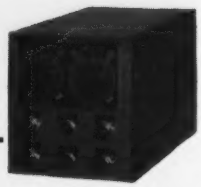
BD61-2

Litho in U.S.A.

announcing!



See SpeedAc
at the Show
Booth #21



new high speed
with
new high accuracy

the new Richardson SPEED WITH ACCURACY SPEEDAC LINE

To 24* bags per minute...
25—50—100 lb. open-mouth paper or textile bags

Get more bags per minute... ±1 ounce accuracy... with the new Richardson SPEEDAC line... thanks to the new SPEEDAC unit, a dramatic breakthrough in high performance weighing. In addition, the SPEEDAC line embodies all the know-how, all the time-tested features which have made Richardson the leader in the industry for 60 years.

Richardson SPEEDAC can boost output and cut costs in *your* plant, too. Don't delay another day! Get this top flight performer working for *you!* Write or phone **Richardson Scale Company, Clifton, N. J.**

**On free-flowing materials.*

Accuracy capability—up to 2 sigma 1 ounce.

Specify Richardson complete bagging systems

- Flow-engineered Feeder
- SPEEDAC Bagger
- Height-adjustable Sewing Conveyor
- Quick-positioning Sewing Pedestal

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

Sales and service Branches in Principal Cities. Also manufactured in England, France and Australia. Richardson Scales conform to U. S. Weights and Measures H-44 for your protection.

"See our exhibit at the Chem Show"
Check 1520 opposite last page.

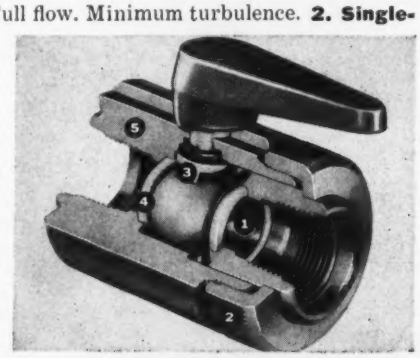
Check 1521 opposite last page.

NEW...
WALWORTH PVC BALL VALVE

...WITH REALLY LONG LIFE BUILT IN

Here's the ball valve that beats them all on longevity—the Walworth Polyvinyl Chloride Ball Valve. With its super-rugged construction, this valve is on the line to stay! □ When you handle tough, corrosive fluids, and want fast, tight shut-off get Walworth PVC Ball Valves. Your Walworth distributor can recommend from the most complete line of PVC Valves and fittings available today.

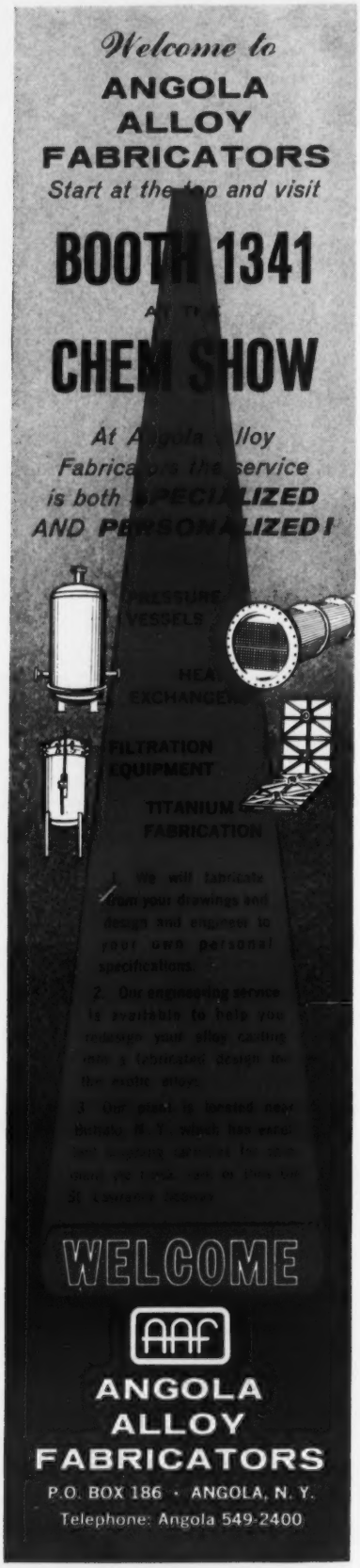
■ *Only Walworth offers all these long life features in a PVC Ball Valve:* **1. Full port opening.** Ball port is same nominal I.D. of the pipe itself. Full flow. Minimum turbulence. **2. Single-end, external adjustment.** Holds operating torque to the minimum. Ball rotates at a fixed location. Maintains alignment. **3. Rugged stem-to-ball construction.** Assures quick, positive shut-off every time. Built to last through 250,000 cycles ...equivalent of *80 years* of normal service! **4. Teflon seat rings.** Fully supported to provide leak-proof seating. High corrosion resistance. **5. Type I normal impact PVC.** Corrosion-resistant, non-aging. Non-toxic. Non-flammable. Extra rugged construction. Write for bulletin 196. • Walworth Co., 750 Third Ave., N. Y. 17, N. Y.



WALWORTH

The Walworth Companies: Alloy Steel Products Company • Conoflow Corporation • Grove Valve and Regulator Company • M & H Valve and Fittings Company • Southwest Fabricating & Welding Co., Inc.

"See our exhibit at the Chem Show"



Check 1523 opposite last page.

COMPANY DIRECTORY

C

Name of Exhibitor	*Booth No.*
California Pellet Mill Company Process Pelleting Division	1257-59
Cambridge Instrument Co., Inc.	376
The Cambridge Wire Cloth Company	1423
Cameron Iron Works, Inc. Pressure Control Equipment Div.	997
Canadian Government Exhibition Commission	1150-52-54-56
Capitol Products Corp. Read Standard Div.	162
The Carbone Corporation Chemical Equipment Division	803
The Philip Carey Manufacturing Co.	1211-13
Carlisle Gas Burner Corp.	1251
Carlon Products Corp.	1198
The Carpenter Steel Company Alloy Tube Division	16
Fred S. Carver, Inc.	90
Centrico, Inc.	842
Centrifix Corporation	1180
Chain Belt Company Carrier Division	127
Chamberlain Engineering Corp.	111

Drop in and see us

Have a suggestion? Or a complaint? Let's talk about it. We'll be in booth 880, on the third floor.

Chemetron Corp. Girdler Process Equipment Div.	219
Chemical Abstracts	86
Chemical and Pharmaceutical Industry Co., Inc.	1064-991
Chemical Construction Corp.	952
Chemical Engineering Catalog	86
Chemical & Engineering News	86-410
Chemical Engineering Progress	1219
Chemical Materials Catalog	86
Chemical Processing	880
Chemical Projects Ltd.	1150
Chemicolloid Laboratories, Inc.	618
Chemineer, Inc.	1220
Chemiquip Company	854
Chemplast, Inc.	808
Cherry-Burrell Corp.	913
Chicago Bridge & Iron Co.	14
Chicago, Rock Island and Pacific Railroad Co.	1401
Clayton Mark & Company Forged Steel Products Div.	1435
The Cleveland Vibrator Co.	993-995
Cobalt Information Center	957
Colonial Rubber Co.	111
Combustion Engineering, Inc. Raymond Div.	646
Commerical Filters Corp.	223
Conax Corp.	1230
Conneaut Rubber & Plastics Co.	111
Continental Can Company, Inc.	899-901-903
Continental-Emsco Co. Industrial Sales Div.	1270
Continental Mfg. Co.	876-1093
Continental Oil Company Petrochemical Dept.	940
Cooper Alloy Corp. Foundry Products Div. Valve and Fitting Div. Vanton Pump Div.	103
The Corley Co., Inc.	1204
Cornell Machine Co.	1212-14
Corning Glass Works Technical Products Div.	134
Crane Co. Industrial Products Group	422
Crane Packing Company	900-902
Crawford & Russell Inc.	1000
Crawford Fitting Company	844
Crescent Petroleum Corp. Metalab Equipment Co.	356
Croll-Reynolds Co., Inc.	1054-1056
Croll-Reynolds Engineering Co. Inc.	1054-1056
The Crown Cork & Seal Co. Machinery Div.	1095
Crucible Steel Company of America Titanium Division	1151-53-55-57
Cryogenics Corp. Dia-Plug Division	1419

D

George W. Dahl Co., Inc.	1427
The Day Company	45
J. H. Day Company	238
Dean Brothers Pumps, Inc.	1245-47-49
Dean Products, Inc. Dean Panel Coil Div.	184
The De Laval Separator Co.	94
Delaware Barrel & Drum Company, Inc.	953-955
Louis DeMarkus Corp.	1030
Dept. of Trade & Commerce, Canada	1150-52

ECO ENGINEERING NEWS

the big name in small pumps for the process industries

• Chemical Show Extra •

New Line of Low-Cost, Heavy-Duty, Series 900 GEARCHEM Pumps

To meet demand for gear pumps of Eco design for greater capacities and wider viscosity ranges, Eco introduces the new 900 Series of GEARCHEM pumps with threaded ports or with integrally cast flanged connections.

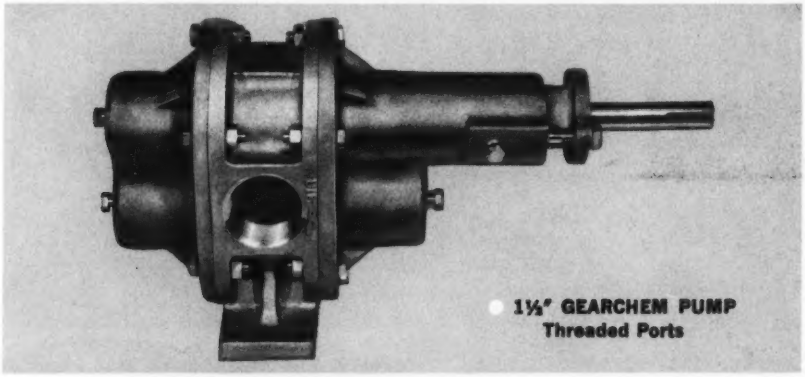
Pump housing is simple Eco three-piece design with press-fitted sleeve bearings, spur gears keyed to shafts and quickly replaced, and stuffing boxes suitable for conventional mechanical packings or mechanical seals. All pumps have bearing flush plugs and lantern rings as standard equipment, and those fitted with metallic gears are equipped with wear plates.

Stock pumps for immediate shipment feature 316 SS casings and shafts with carbon/graphite sleeve bearings, gears of Hastelloy C*, Pentonˣ, phenolic or fluorocarbon resins, and Teflon†-packed stuffing box with lantern ring. Lantern ring may be used to introduce a suitable lubricant and sealant, or it may be connected to pressure purge or flush system.

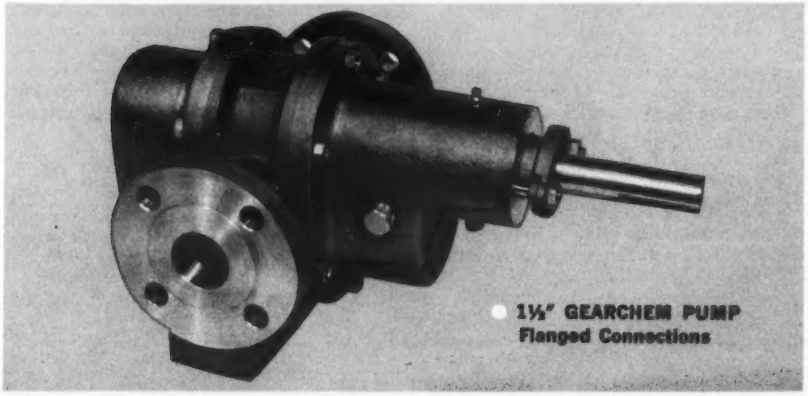
John Crane #9 mechanical seal can also be supplied to meet specific conditions.

Special gear, bearing and wear plate materials are available for conditions beyond the capabilities of standard pump component materials of construction.

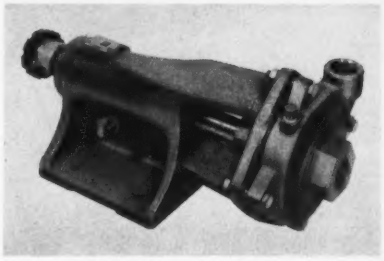
Series 900 GEARCHEM pumps are offered with a complete assortment of drives including belt-drive assemblies. For details, please see Eco Bulletin 1261.



1½" GEARCHEM PUMP
Threaded Ports



1½" GEARCHEM PUMP
Flanged Connections



New ¾" x 1" End-Suction CENTRI-CHEM Pumps in Hastelloy B or C

The new Eco CENTRI-CHEM pumps to be exhibited at the Chem Show were expressly developed to meet the demand for low-cost, end-suction centrifugal pumps in Hastelloy B and C. Easily maintained, these pumps feature an extensive choice of mechanical seals and provide flows to 35 gpm with differential heads to 56 feet and permissible system working pressures to 100 psi. John Crane #9 mechanical seals can be furnished, on request, in lieu of standard Eco mechanical seals.

In vertically split design, this new CENTRI-CHEM pump is offered as a pedestal-mounted model or integrally mounted with motor.

A Cordial Invitation...

Is extended to all attending the 28th Exposition of Chemical Industries at the New York Coliseum, Nov. 27th to Dec. 1st, to visit the Eco Engineering Company Booth No. 978.

See what's new and get sound application information. See working demonstrations of processing equipment and obtain data on new materials of construction. Competent personnel will be on hand for consultation without obligation.

*Trade Name of Haynes Stellite Co.
ˣTrade Name of Hercules Powder Co.
†Trade Name of E. I. du Pont de Nemours & Co.

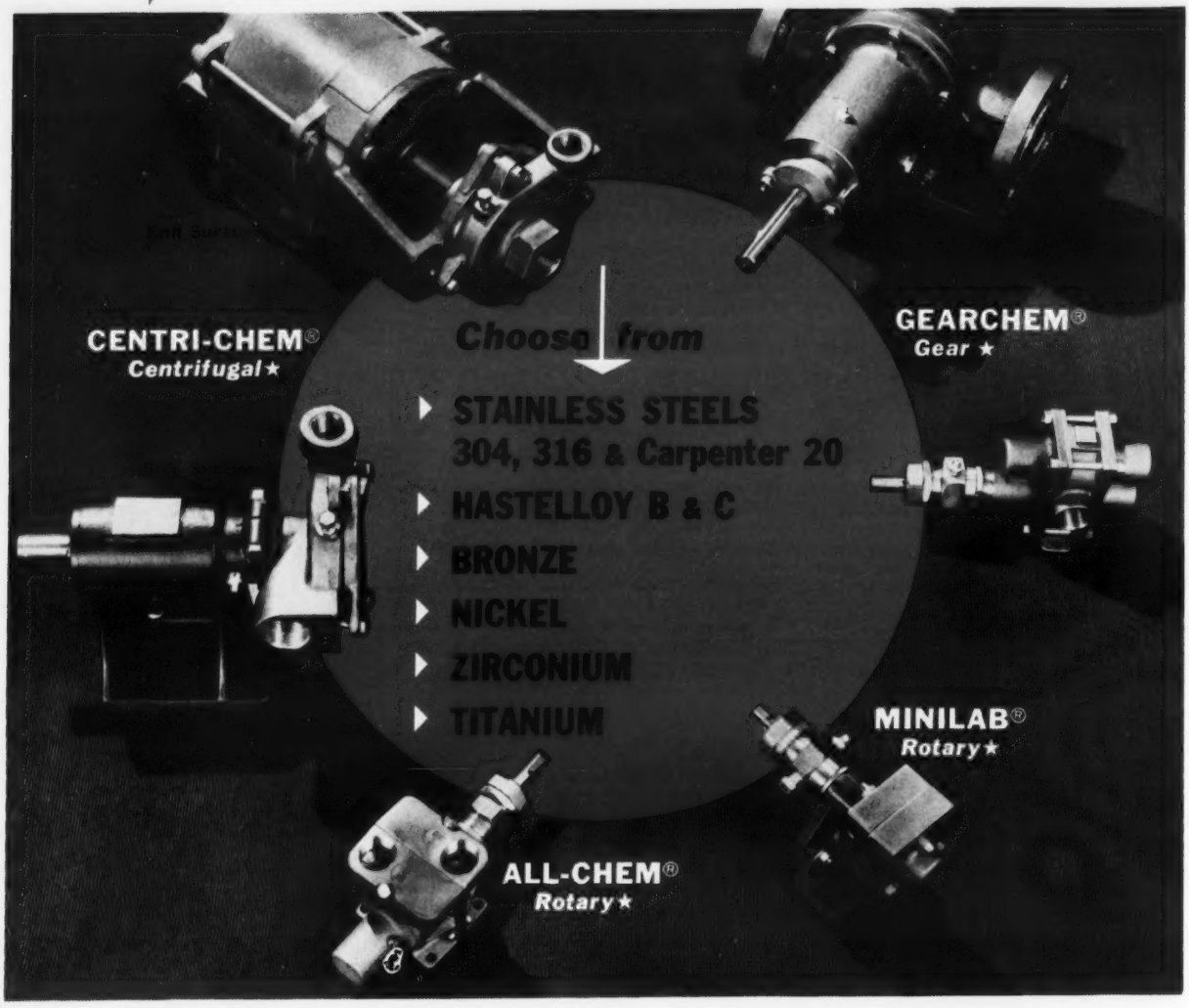
ECO ENGINEERING COMPANY 12 New York Avenue NEWARK 1, N.J.

ECO ENGINEERING NEWS *Chem Show Extra*

HIGHLY STANDARDIZED LINE OF LOW COST PROCESS PUMPS

IN STOCK

FOR IMMEDIATE SHIPMENT IN ALL MATERIALS OF CONSTRUCTION



ROTARIES: If you want linear, non-segmented, non-foaming flows, ideal for shear-sensitive emulsions and safe for auto-detonating fluids—select the self-priming Eco ALL-CHEM Rotary displacement pump. Designed for severe corrosive service. For reduced viscosities and temperatures to 250° F. Capacities to 10 gpm. Pressures to 75 psi. Suitable for metering in conjunction with Rotometers.

Eco pumps are available in the widest variety of corrosion resistant alloys and non-metallics to meet virtually all requirements of the chemical and allied processing industries.

CENTRIFUGALS: If you want widely applicable, corrosive-resistant centrifugal pumps handling most chemicals, select Eco CENTRI-CHEM Pumps. These pumps are designed to meet the standardization programs of major, multi-plant chemical companies. Capacities to 40 gpm. Heads to 57 feet.

GEAR PUMPS: If you require self-priming and intermittent or sustained operation with constant flow metering and reproducible accuracy—handling acids, oxidants, alkalies, aromatics, solvents—select Eco GEARCHEM Pumps. For temperatures up to 400° F. Pressures to 100 psi.

Mass Produced and Stocked for Immediate Delivery

Eco Pumps are *not* "custom built" with attendant slow delivery and high cost. They are stock pumps, produced in volume on automatic "program" machine tools where multiple operations are performed to reduce needless labor and handling. This results in lower prices, precision uniformity and complete interchangeability of parts to meet customer requirements and to facilitate field servicing. Ask for literature on the complete Eco pump line.

Call or write for Immediate Quotation or Shipment . . .

ECO ENGINEERING CO. 12 New York Ave. Newark N J. Phone: MArket 4-6565

Name of Exhibitor	*Booth No.*
Derrick Manufacturing Co.	811
J. P. Devine Manufacturing Co.	1354-1356
DeZurick Corp.	907
Distillation Engineering Co.	1048
John L. Doré Co.	1295-1297
Dorr-Oliver Inc.	531
Dravo Corp.	1100
Dresser Industries, Inc. Clark Bros. Co. Pacific Pumps, Inc. Podbielniak, Inc. Roots-Connersville Blower	595
The Ducon Co., Inc.	990-992
Duralab Equipment Corp.	359
Durametallic Corp.	1216
The Duriron Co., Inc.	520-532
Dustex Corp.	1299-1301
Du Verre, Inc.	889-891
Dynametrics Corp.	1311
E	
The Eagle-Picher Co. Insulation Div.	1167-69
Eaton-Dikeman Co.	1120
Eaton Manufacturing Co. Cleveland Worm and Gear Div. Farval Division	74
Eastman Kodak Recordak Div.	838
Eberly Dynamics, Inc. Protective Plastic Co.	1411
Eclipse Lookout Co. Eclipse Boiler Div.	973
Economy Faucet Co. **Eco Engineering Co.**	978
R. J. Eiche & Associates, Inc.	1236-68-70
The Eimco Corp.	80
The Electrolyser Corp., Ltd.	1150
Encyclopaedia Britannica	1182

"Next time you sell one off the floor, unplug it."

"See our exhibit at the Chem Show"
Check 1524 opposite last page.

COMPRESSION!

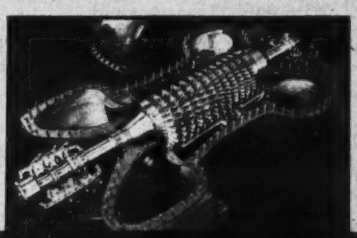
☐ NO LUBRICATION ☐ NO CONTAMINATION ☐ NO MAINTENANCE

SULZER NON-LUBRICATED RINGLESS PISTON COMPRESSORS

...are available for capacities from 10 to 4,000 cfm and discharge pressures up to 650 psig. The construction of these compact, standardized 1, 2 and 3 stage units are the result of Sulzer's 25 years of experience in their design and manufacture. These compressors also have a unique ringless piston and frictionless piston rod stuffing-box which requires little or no maintenance and assures absolutely contamination-free compression of Air, Oxygen, Hydrogen, Dry Chlorine and other Industrial gases. Sulzer Non-Lubricated, Ringless Piston Compressors are also available for refrigeration with capacities from 400,000 to 4,000,000 B.T.U./h. Suitable for extremely low temperatures, these Dry Piston Compressors cannot contaminate the refrigerant, preventing the formation of oil films in evaporators and condensers.

SULZER AXIAL COMPRESSORS

...are available for suction volumes from 20,000 to 300,000 cfm and pressure ratios up to 5 in a single casing. Proved exceptionally economical, dependable and trouble-free for Chemical Processing, Blast Furnace and Wind Tunnel application, Air Separation Plants, etc., the Sulzer Axial Compressor features a patented blade design which resists erosion and remains unaffected by fouling.



SULZER CENTRIFUGAL COMPRESSORS are available with capacities from 2,000 to 30,000 cfm.

For further information and specifications contact:

SULZER

Manufacturing And Servicing Compressors Since 1877

SULZER BROS. INC. • 50 Church Street, New York 7, N. Y.

"See our exhibit at the Chem Show"

Check 1525 opposite last page.

TWO IMPORTANT NEW COWLES MODELS NOW AVAILABLE

Model 515-VHV—for low to medium volume production.

Capacity—50 to 200 gallon batches.

Power—10 to 15 hp.

Height—raised position, 125"; lowered position, 83".

Base dimensions—18 x 24½".

Patented Cowles Impeller with "The teeth that make the BIG difference".

MPD* (Maximum Power Delivery) variable speed transmission system, capable of delivering over 90% of motor horsepower to the impeller even at slowest speeds.

Hydraulic lift with maximum bridge rise of 42". Can be raised or lowered during operation.

Full instrumentation, with built-in ammeter and tachometer.

Model 5-VTV for small production, pilot plant, or laboratory:

Capacity—5 to 40 gallon batches.

Power—3 hp.

Height—raised position, 49"; lowered position, 38".

Base dimensions—16" x 23⅛".

Hinge mount and tilt back through 45°; hydraulic lift.

Variable speed.

Comes equipped with stainless steel Cowles impeller (including shaft) in three interchangeable sizes—4", 6" and 8". Impellers will center in containers up to 16" in diameter.

Cowles Dissolvers efficiently mix, deagglomerate, dissolve and disintegrate materials in processing solid-liquid, liquid-liquid and gas-liquid products in viscosities of up to 50,000 centipoises or more.

Based on over half a century of experience in the design and engineering of dispersing equipment, they will produce more, in less space, at less cost than any other mixers of comparable size on the market. Let us prove it in your plant at our risk.

Write today for more complete information.

MOREHOUSE COWLES

Convenient lease and time-payment plans. Representatives in principal cities.

MOREHOUSE-COWLES, INC.

1150 San Fernando Road Los Angeles 65, Calif.
*Trade Mark

Please send me information on Cowles Dissolver
Model 515-VHV ☐ — Model 5-VTV ☐
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Firm .....
Address .....
City ..... Zone .... State .....
419

At the Chemical Show, visit Booth 814.

Check 1526 opposite last page.

COMPANY DIRECTORY

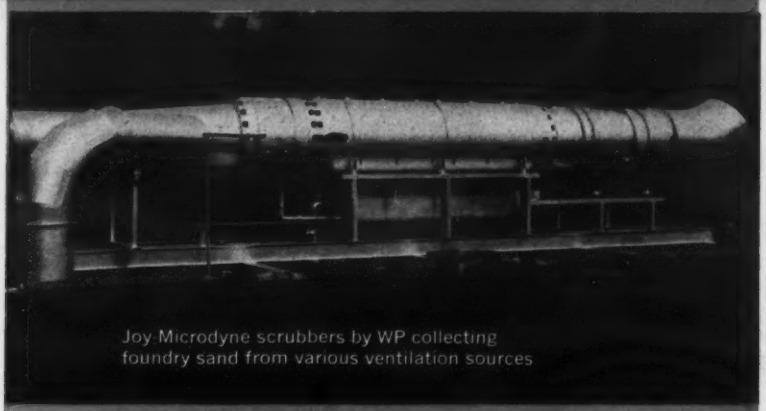
Name of Exhibitor	*Booth No.*
Engelhard Hanovia, Inc. Hanovia Lamp Div.	192-196-225
Engelhard Industries, Inc. Amersil Quartz Div.	192-196-225
Eriez Manufacturing Co.	909-911
Ertel Engineering Corp.	623
Ethylene Corp.	971
Ever-Tite Coupling Co., Inc.	1159
The Exact Weight Scale Co.	79
F	
FMC Corporation	888-890-892
Chiksan Company, Div.	
Peerless Pump, Hydrodynamics Div.	831
Fairbanks, Morse & Co. Compressor Div.	1321-23
Scale Division	1325-27

During and after the show

Want to check for things you might have missed? This month's issue of CHEMICAL PROCESSING magazine contains descriptions of the show's high points, tagged for easy spotting. Be sure and look it over.

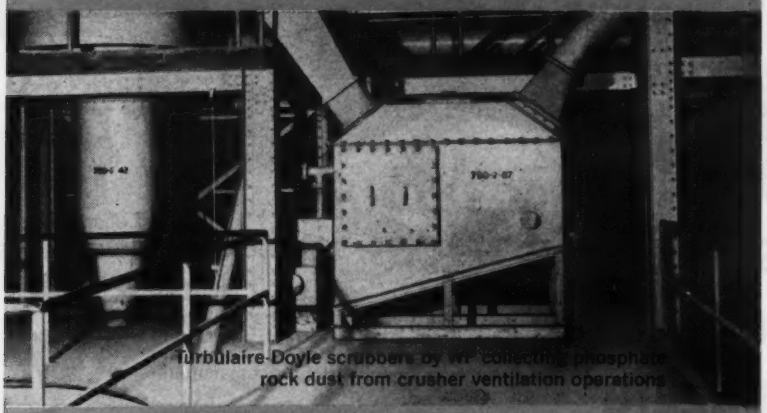
Falls Industries, Inc.	131
Fansteel Metallurgical Corporation Chemical & Metallurgical Div.	617
Ferranti Electric, Inc.	1144
Fike Metal Products Corp.	1386
Filterite Corp.	1302
Filtomor, Incorporated	1422
First Machinery Corp.	1418-20
The Falcon Manufacturing Div.	
Dave Fischbein	872
Fischer & Porter Company	528
The Fitzpatco Corp.	175
The Fitzpatrick Company	175
Florida Development Commission	1037-50
Flo-Tronics, Inc.	
Air Conveying and Electronic Control Div.	1115
Flowline Corp.	805
Fluid Energy Processing & Equipment Co.	813
Food Business	880
Food Processing	880
Forté-Fairbairn, Inc. Forté Engineering Co., Div.	1226
Fostoria Corporation	
Chempump Div.	659
The Foxboro Company	519
Fram Corp. Warner Lewis Co., Div.	1455
Freezing Equipment Sales, Inc.	446
Frick Company	1289-91
Fruehauf Trailer Company Special Products Div.	1102
G	
Gabb Special Products, Inc.	1146
The Galigher Company	843
Gems Co.	1343
General American Transportation	
Corp. Container Division	436-442
Field Erection Div.	436-442
Fuller Company, Subs.	446
Dracco Division	495
Lehigh Fan & Blower Div.	446
Sutorbilt Corp., Div.	446
Traylor Enginering & Mfg.	495
Infilco Incorporated	435
Kanigen Division	436-442
Overseas Division	432-444
Piggyback Div.	436-442
Plate and Welding Div.	436-442
Plastics Div.	436-442
Process Equipment Div.	436-442
Research & Development Div.	436-442
Tank Car Div.	436-442
Tank Storage Terminals Div.	436-442
Turbo-Mixer Div.	436-442
General Dispersions, Inc.	967
General Dynamics Corporation	
Liquid Carbonic Division	924-926
General Electric Company	482
Apparatus Sales Div.	
General Machine Company of New Jersey	1391
General Plastics Corp.	967
Georgia Marble Co. Alberene Stone	465
Gifford-Wood Company	234
Glamorgan Pipe & Foundry Co.	1110
Glengarry Processes, Inc.	121
Glosta Manufacturing Co. Ltd.	1150
Goodyear Pumps Inc.	1344
Goulds Pumps, Inc.	1288-90-92-94
Graham Manufacturing Co., Inc.	1067-69
Graham Transmissions, Inc.	1053-66
Gray Tool Company	1363
Great Lakes Carbon Corp.	204
Dicalite Department	
Electrode Division	
Mining & Mineral Products Div.	
Nero Products Dept.	
Perlite Department	

Check 1527 opposite last page.



Joy Microdyne scrubbers by WP collecting foundry sand from various ventilation sources

A Pennsylvania foundry operator... and a Montana rock crusher...agree:



Turbulaire-Doyle scrubbers by WP collecting phosphate rock dust from crusher ventilation operations

When DUST is your problem— CLEAR IT WITH WP*

For an efficient, economical solution to any dust control problem—look to Western Precipitation. WP is uniquely fitted to handle your unique problem—being the one organization that custom designs, engineers and installs ALL types of dust and fume control equipment: Precipitator, Mechanical, Jet-Cleaned Filter, Hi-Temp Filter, scrubbers and engineered combinations.

With no axes to grind for any one system, WP engineers will give your job a completely unbiased recommendation—whether it's a quote on your specifications, a single component, or a completely engineered installation . . . small, major, simple, or complex.

An inquiry—on your business letterhead—will bring you literature promptly. Just write Western Precipitation, 1000 W. 9th St., Los Angeles 54, Calif. (In Canada, write 8285 Mountain Sights Ave., Montreal, P.Q.)

Dust and fume control since 1907

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Division of Joy Manufacturing Company

ELECTROSTATIC Precipitators
MULTICLONE Collectors
CMP Combination Units
DUALAIRE Jet-Cleaned Filters
THERM-O-FLEX Hi Temp Filters

TURBULAIRE Scrubbers
JOY-MICRODYNE Scrubbers
also: HOLO-FLITE Processors
HI-TURBIANT Heaters
TURBULEX Calciners

VISIT W P CHEM SHOW BOOTHS 1346-50

solve the processing puzzle with EASTERN CENTRIFUGAL PUMPS

In every detail of size, weight, space requirements, materials, power and costs, Eastern Centrifugal Pumps are made to match strict process requirements.

- **PRESSURES:** to 21 psi in single stage pumps; to 70 psi in multi-stage types
- **FLOWS:** capacities to 70 gpm in single-stage pumps, to 10 gpm for many multi-stage models
- **MOTORS:** standard motors for 115/230-volts 60 cycles 1 phase (other electrical characteristics available). Power range from ⅛ to 1½ H.P.
- **ENCLOSURES:** drip-proof, totally enclosed, and explosion-proof ball-bearing frames
- **DRIVES:** all models available in belt or coupling drive with ball-bearing equipped stands. Space-saving close-coupled pumps most rugged and popular — but many pedestal models also available
- **SEALS:** a variety of rotary seals and stuffing boxes, to fit every application
- **METALS:** your option of cast iron, bronze, stainless steel (18-8 type 303 and 316) Monel, Cast Iron, Hastelloy "C"
- **INSTALLATIONS:** a wide range of transfer, recirculation, feed, boost, and filter-pumping applications

TO FIND OUT: write for the brand-new Centrifugal Pump Catalog — Bulletin 130. Here are all the models — including useful engineering data.

For a complete review of positive displacement pumps for non-lubricating fluids, write for Bulletin 220. Eastern Bulletin 400 is your guide to a broad line of midget-centrifugal pumps and stirrers for the laboratory.

For your laboratory or pilot production line consider Eastern midget centrifugal pumps and stirrers — and Eastern portable, top-, side-entering mixers (Bulletin 530). Chances are, the one unit you need is in one of these useful brochures. Write for them now!

See the big Eastern pump — and mixer line at the Chem. Show: booth 1275.

EASTERN INDUSTRIES PUMP DIVISION

EASTERN INDUSTRIES, INCORPORATED

100 SKIFF STREET • HAMDEN, CONNECTICUT
West Coast Office: 4203 Spencer St. • Torrance, Calif.

Other Eastern products: • hydraulic motors • gear pumps • positive displacement pumps • aircraft pumps

Name of Exhibitor	*Booth No.*
Great Western Mfg. Co.	216
The Greif Bros. Cooperage Corporation Research & Engineering Div.	41
Grinnell Company, Inc.	566
Groen Mfg. Co.	1403
Gulf Publishing Co.	1035
Gulton Industries West Instrument Corp., Subs.	1226-28
B. F. Gump Co.	1022-24-26

H

Hallikainen Instruments	1186
Hamilton Kettles	623
Hapman Corporation Conveyor Division	923
Harbison-Walker Refractories Co.	1241-43
Hardinge Company, Inc.	582
Hardy Scale Co.	1187
The H. M. Harper Co.	834
Hastings-Raydist, Inc.	1020
Haveg Industries, Inc.	546
Hayward Filter Co.	1408
Heil Process Equipment Corp.	1305
Heliflow Corporation	1067-69
Hercules Filter Corp.	213
Hercules Powder Company Polymers Division	916
Herman Hockmeyer & Co.	1178
High Pressure Equipment Co. Inc.	1215-17
Hills-McCanna Co.	1307-09
Hoffman Industries, Inc. Air Appliance Division	1394
Hoke Inc.	163
Hoover Ball and Bearing Tote System Div.	856-858-860

Drop in and see us

Have a suggestion? Or a complaint? Let's talk about it. We'll be in booth 880, on the third floor.

Hotpack Corp.	373-375
The Frank G. Hough Co.	63
The Howe Scale Co.	894-896
S. Howes Co., Inc.	943-947
Hudson Industries Corp.	1095
Humble Oil & Refining Co. Enjay Chemical Co., Div.	946-948-950
Rodney Hunt Machine Co. Process Equipment Div.	1240-44

EASTERN PORTABLE MIXERS

especially designed for small batch processes

offer . . . precise mixing results with long term cost savings

Eastern Portable Mixers are especially designed for dependable, low cost service in small batch processes. Where fixed mounted installations are not required, Eastern's Portables offer greater versatility, ease of handling, and long term cost savings.

Speeds of 420, 1125, and 1725 R.P.M. rated from 1/20 to 3 H.P. are standard, with variable speed and air-driven models also available. Motors in all standard types can be supplied in semi-enclosed, totally-enclosed, or explosion-proof construction. Shafts and single or dual propellers are available in a choice of alloys for all service requirements. New optional ball-swivel clamp as illustrated, permits easy adjustment of mixer position in tank.

For a personalized analysis of your mixing problems, send details to Eastern engineers. A recommended solution will be furnished promptly and without obligation. For a helpful guide to mixing fundamentals, write for "Handbook of Fluid Mixing."

NEW PORTABLE MIXER BULLETIN

Eastern's improved line is included in the revised Portable Bulletin No. 530-A.

Eastern INDUSTRIES, INC.
MIXER DIVISION
Regent Street
East Norwalk, Conn.

"See our exhibit at the Chem Show"

Check 1528 opposite last page.

Check 1529 opposite last page.

Fig. G-225 Note complete accessibility of machine. Slitters fold back, feed rolls open up, head is available.

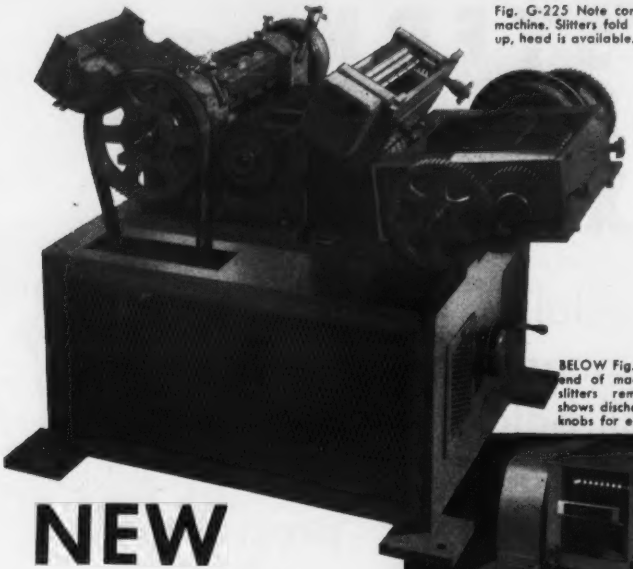

FIG. G-225

BELOW Fig. G-226 shows infeed end of machine with cover for slitters removed. Fig. G-227 shows discharge end. Note hand knobs for easy accessibility.

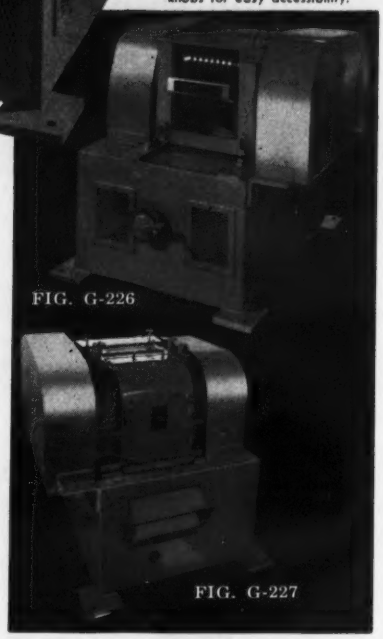

FIG. G-226

FIG. G-227

NEW

"GIANT" 800 SERIES HIGH SPEED HIGH PRECISION DICERS & PELLETIZERS

Taylor-Stiles "GIANT", 800 Series Dicers and Pelletizers are designed for modern, integrated processors who compound vinyl, polypropylene, and other plastics. They are low cost, high speed, high precision machines requiring low horsepower to operate. Their unique design allows full, free access to all parts simply by turning a hand wheel, (no tools required), and tilting the top feed roll assembly out of the way as seen in Figure 225. Vari-size spacers compensate for knife wear. The whole length of the knives rest on these precision surface spacers. This results in a perfectly symmetrical unit which is free from vibration. And of course these new 800 series cutters use the shear cutting principle as in all "GIANT" Cutters. Since the force is being applied at only one point at a time, much less power is needed, resulting in smaller motor requirements, a savings in initial and operating cost. All parts in contact with the product are stainless steel. Cutterheads are one piece stainless steel forging with integral shaft. Fly knives are firmly held by wedges in milled slots. Knives are placed so that bevelled edge of the knife is nearly parallel to center of rotation producing smooth cutting (not breaking) action, resulting in a cleaner cut with practically no fines and much longer knife life.

For the processor desiring the ultimate in efficient, low cost cutting equipment, these 800 series "GIANT" Dicers are the answer. And all "GIANT" Cutters are backed up by a complete engineering and service organization. These men are thoroughly familiar with all aspects of size reduction and industrial cutting machinery and are happy to aid and advise you on any questions you may have.

Another of the services which Taylor-Stiles provides prospective customers is to cut some of their raw material so that they can see exactly what they will get before they buy a machine. If you desire this service, just send us a small sample of your product along with information as to size of pellet desired. Return the coupon today for free information on "GIANT" Cutters.

INDUSTRIAL CUTTING EQUIPMENT FOR PLASTICS, RUBBER, TEXTILE, PAPER AND OTHER INDUSTRIES: MACHINERY FOR BALE OPENING.

☐ I would like more information on free sample cutting services.

☐ I would like more information on your pelletizers.

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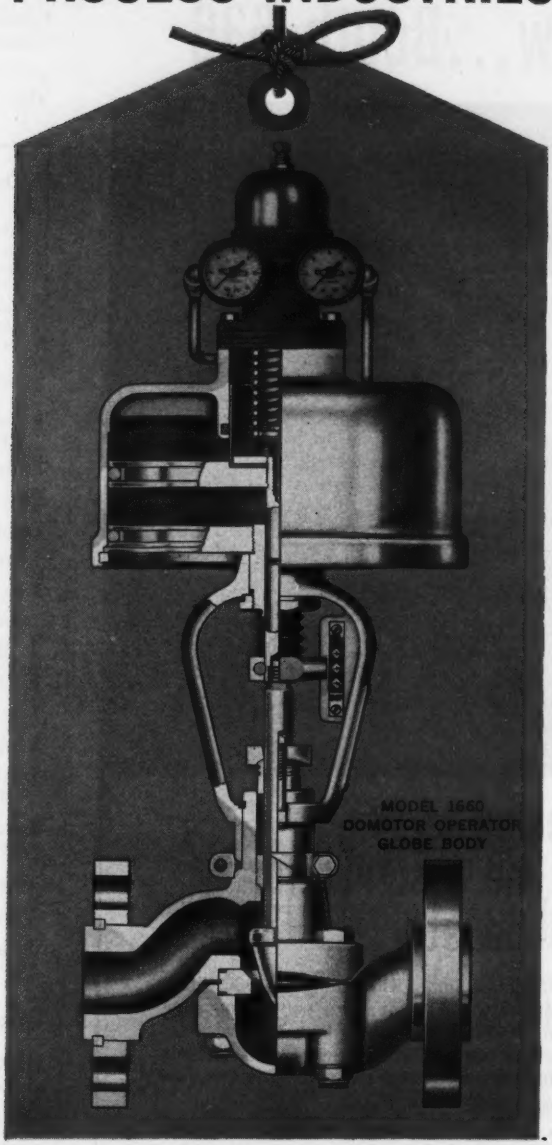
"See our exhibit at the Chem Show"

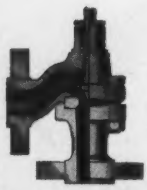
COMPANY DIRECTORY

Name of Exhibitor	*Booth No.*
Hydril Company	1188
Hydrocarbon Processing	1035
Hydromatics, Inc.	1032-34
I	
I-T-E Circuit Breaker Company	64
Illinois Water Treatment Co.	864
Industrial and Engineering Chemistry	86
Industrial Filter & Pump Mfg. Co.	15
Industrial Nucleonics Corp.	1374-76-78
Industrial Powertronix Inc.	1187
Ingersoll-Rand Co.	128
The Aldrich Pump Co., Subs.	1375-77
IBM	1070
Service Bureau Corp., Subs.	
Instrumentation Associates, Inc.	203
International Basic Economy Corp.	
The V.D. Anderson Co., Div.	1265
The International Nickel Co., Inc.	509
J	
Jabsco Pump Co.	1016-18
Jacoby-Tarbox Corporation	1362
Jamesbury Corp.	983-985
The Jeffrey Manufacturing Co.	97
Jenkins Bros.	409
Jerguson Gage & Valve Co.	989
Johns-Manville	415-645
The Johnson Corp.	1128-30
The Johnson-March Corp.	1450
Journal of Agricultural and Food Chemistry	86-410
Joy Manufacturing Co.	1346-48-50
Western Precipitation Div.	
K	
Keasbey & Mattison Co.	822
Kennametal Inc.	963
Kennedy Van Saun Mfg. & Engr. Corp.	1036
Kewaunee Mfg. Co.	398
Keystone Valve Corp.	1236-68
Kinetic Dispersion Corp.	1367-69
Maurice A. Knight Co.	586
S. P. Kinney Engineers, Inc.	1237
Komline Sanderson Engr. Corp.	25
Kraloy/Chemtrol Co.	1111
The Kuhns Brothers Co.	1444

WHY ANNIN IS A LEADING SUPPLIER OF CONTROL VALVES TO THE PROCESS INDUSTRIES



Annin control valves have been designed with the needs of the process industries in mind. The split body, single seat construction reduces body turbulence and erosion, gives longer life. The interchangeability of Annin valve components, the easily replaceable trim, the option of angle or 3-way bodies carried in stock for immediate shipment, simplifies your installation and maintenance problems. The flexibility in basic design cuts down on the valve parts inventory ordinarily required for a variety of plant applications. Another factor is the $1½ million in alloy body parts regularly carried in Annin stock, including a wide range of 300 series stainless steels, Hastelloys, Monel, Inconel, Durimet-20, and a variety of bronzes. If reduced valve inventory, design flexibility, and economical maintenance are factors in your operation, we suggest you investigate the advantages inherent in Annin process control valves.



ANGLE BODY

For fluid problems involving solids in suspension, high viscosity fluids, and applications requiring special nozzle materials or design.

3-WAY BODY

Provides two horizontal line connections and an individual bottom vertical line connection. Sections may be rotated for convenience.

CORNER BODY

Standard for body sizes ½"–2". Often used to replace expensive alloy ells, this body simplifies installation and conversion on the job.

ANNIN DESIGN FLEXIBILITY reduces inventory... simplifies installation and maintenance...as no other control valve can!

Send today for General Catalog 1500-E

ANNIN VALVES

Products that work for your profit.

THE ANNIN COMPANY
1040 S. Vail Avenue • Montebello, California

"See our exhibit at the Chem Show"

Check 1531 opposite last page.

ideas and news:

at the Chem Show...Booth 636

See the unveiling of a new pump line designed for the chemical industry

This new line of Allis-Chalmers pumps, with ratings to 880 gpm, heads to 315 ft, temperatures to 550°F, features self-venting, top centerline discharge. Complete rotating element, including impeller, is easily removable from the rear of the pump without disturbing piping. A number of stuffing box options are offered. The new line has maximum parts interchangeability.

See these new pumps at the Chem Show. See, too, our ACAP adjustable pumps and ELECTRI-CAND leakless pumps. Or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

A-1562

Get a first-hand look at these other A-C products:

TWINDUCER grinding mill drives • SUPER-SEAL motors • corrosion-proof pushbutton stations • vibrating and gyratory screens • new rubber-seated, pneumatically operated wafer valve.

Twinducer, Electri-Cand, ACAP and Super-Seal are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Check 1532 opposite last page.

COMPANY DIRECTORY

L

Name of Exhibitor	*Booth No.*
LKB Instruments, Inc.	1116
Laboratory Equipment Corp.	1051
Laboratory For Electronics, Inc. Eastern Industries, Inc. Div.	1275
Laboratory Furniture Co., Inc.	310
The LaBour Company, Inc.	42

During and after the show

Want to check for things you might have missed? This month's issue of CHEMICAL PROCESSING magazine contains descriptions of the show's high points, tagged for easy spotting. Be sure and look it over.

Lapp Insulator Co. Process Equipment Div.	696
Lauda Instruments, Inc.	329
Lawrence Pumps, Inc.	852
Lead Industries Association	816
Lead Lined Iron Pipe Co.	70
Lee Metal Products Co., Inc.	1384
Leeds & Northrup Co.	50
J. M. Lehmann Company, Inc.	60
Leslie Co.	1333
Lignosol Chemicals Ltd.	1150
Link-Belt Company	165
Littleford Bros., Inc. Mixer Division	1262-64
Lock Joint Pipe Co. Oscar Davis Co, Inc. Subs.	1078
Logan Emergency Showers, Inc.	883
The Lunkenheimer Co.	1380-82
Lukens Steel Company	201

Mc

McCartney Manufacturing Company, Inc.	1129
McFarland Engineering & Pump Co.	1363
McGraw-Edison Co., Thomas A. Edison Industries, Instrument Div. Pittsburgh Lectrodryer Div.	908 931
McGraw-Hill Book Co., Inc.	974
McGraw-Hill Publishing Co., Inc.	432-481
McIntosh Equipment Corp. Process Equipment & Specialties Stocking Div. Walker, Crosweller Div.	1343
McNab, Incorporated	935

M

Name of Exhibitor	*Booth No.*
Macalaster Bicknell Corp.	314
The Madden Corporation	1136
Magnetrol Inc.	910-912
Manton-Gaulin Manufacturing Company, Inc.	51
Marcan Products Corp.	1187
Marshall Control Products Co.	1187
Martin Engineering Company	1118
Melrath Canned Pumps, Inc.	1347
Metal-Cladding, Inc.	1184
Metal Hydrides Inc.	964
Metalsalts Corporation	933
Mettler Instrument Corp.	399
Michigan Chemical Corp.	942
Middle States Corporation Davenport Machine & Foundry Company, Div.	818
Franklin P. Miller & Son, Inc. Supreme Div.	1010
Miller Products Company, Inc.	1092
Milton Roy Co., Serfass Corporation	675
Mine Safety Appliances Company	158
Minneapolis-Honeywell Regulator Co.	635
Mission Manufacturing Co.	1258-60
Mixing Equipment Co., Inc.	146
Monarch Mfg. Works, Inc.	881
Mooney Brothers Corp., Chem Flow Corp., Subs.	1045
Morehouse-Cowles Inc.	814
Morland Associates	1383
Multi-Metal Wire Cloth Company, Inc.	214

N

The Nalge Co., Inc. American Agile Co., Subs.	917
The Nalge Co., Inc., American Vulcathene, Div.	1201
Namco Machinery Inc.	365
The National Drying Machinery Co.	1112-14
National Dust Collector Corp.	695
National Engineering Company Simpson Mix-Muller Division	695
Nettco Corporation	46
Newark Wire Cloth Company	183
New Brunswick Scientific Co., Inc.	324
New York Air Brake Co. B-I-F Industries, Inc., Div.	660

ideas and news:
at the Chem Show...Booth 636

See open MOTORS like this, straight from actual installations

This is one of our SUPER-SEAL open motors. You'll see several of them at the show, taken from industry's most demanding installations. Key to their endurance is their POXEAL or SILCO-FLEX insulation systems which make these motors practically impervious to moisture, dust, abrasives, and most other contaminants.

See "veteran" SUPER-SEAL motors at the Chem Show. Or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

A-1565

Get a first-hand look at these other A-C products:

vibrating and gyratory screens • ELECTRI-CAND leakless pumps • ACAP adjustable pumps • new chemical pump line • TWINDUCER grinding mill drives • corrosion-proof pushbutton stations • new rubber-seated, pneumatically operated wafer valve.

Twinducer, Electri-Cand, ACAP, Silco-Flex, Poxeal and Super-Seal are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Check 1533 opposite last page.

ideas and news:

at the Chem Show...Booth 636

See a GYRATORY SCREEN that gives 35 sq ft of screening area in only 16 sq ft of floor space

The stacked-deck design of Allis-Chalmers gyratory screens conserves valuable floor space — separates materials into 2, 3 or 4 products. Stainless steel construction cuts maintenance requirements, reduces downtime. A-C gyratory screens handle abrasive or corrosive materials, dry foods and pharmaceuticals with care. Gentle, quiet, vibration-free operation means minimum disintegration of fragile particles . . . improves efficiency and productivity.

Got a screening problem? See us at the Chem Show. Or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

A-1563

Get a first-hand look at these other A-C products:

TWINDUCER grinding mill drives • ELECTRI-CAND leakless pump • ACAP adjustable pumps • new chemical pump line • SUPER-SEAL motors • corrosion-proof pushbutton stations • vibrating screens — new rubber-seated, pneumatically operated wafer valve.

Twinducer, Electri-Cand, ACAP and Super-Seal are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Check 1534 opposite last page.

COMPANY DIRECTORY

Name of Exhibitor	*Booth No.*
Niagara Blower Company	655
Nicholas Fodor & Assoc. Ltd.	1150
Nichols Engineering & Research Corporation, Nerco-Niro Spray Dryer Division	624
Norcross Companies, Kem-Feed Division	868
Norcross Corporation	443
Norwalk Company, Inc.	20
NoVo Industrial Corp., Mitchell Specialty Div.	1039
Nuclear Enterprises Ltd.	1150
Numec Instruments & Controls Corp.	1429
O	
The E. T. Oakes Corporation	1424
Oakite Products, Inc.	1072
D. T. O'Connor, Inc.	1415
The Okadee Company	1342
Orbit Valve Company	1415-32
Overstrom & Sons	37
Owens-Illinois Kimble Glass Co., Subs.	396
Oxy-Catalyst, Inc. Industrial Department	1413
P	
Pacific Valves, Inc.	1266
Pack Column Corp.	1171
Pall Corporation	812
Pallmann Pulverizers Co., Inc.	1373
Pangborn Corp.	681
Parker-Hannifin Corp. Parker Fittings & Hose Div.	431

"No, I don't know who's giving away taffy apples."

Name of Exhibitor	*Booth No.*
Parker Seal Co.	431
Parks-Cramer Company	55
The Patterson Foundry and Machine Co.	154
Patterson-Kelly Co., Inc.	188-190-215
Peabody Engineering Corp.	821
Peerless Mfg. Company	1008
Pennsylvania Fluorocarbon Co., Inc.	969
The Perkin-Elmer Corporation	386
Peterson Filters & Engineering Co.	1366-68-70
Petroleum Refiner	1035
Pfaudler Permutit Inc.	110-141
Philadelphia Gear Corp.	123
Photovolt Corp.	389
Pick Manufacturing Co.	1345
Pittsburgh Corning Corp.	1239
Pocono Fabricators Inc.	188-190-215
Porter Engineering Co.	1133-35-37
Horace T. Potts Co. Speedline Fittings Div.	980
The Wm. Powell Co.	133
Power-Curve Conveyor Co.	1165
Prater Pulverizer Co.	904-906
Precision Scientific Co.	370-372
Premier Mill Corp.	941
Pressed Steel Tank Co.	631
Pressure Products Company	1409
Procedyne Associates, Inc.	1453
Proctor & Schwartz, Inc. Food & Chemical Dryers Div.	684
Productive Equipment Corp.	224
The Protectoseal Company	1286
Pulva Corp.	220
Putman Publishing Co.	880
The J. L. Putnam Co., Inc.	1040-42

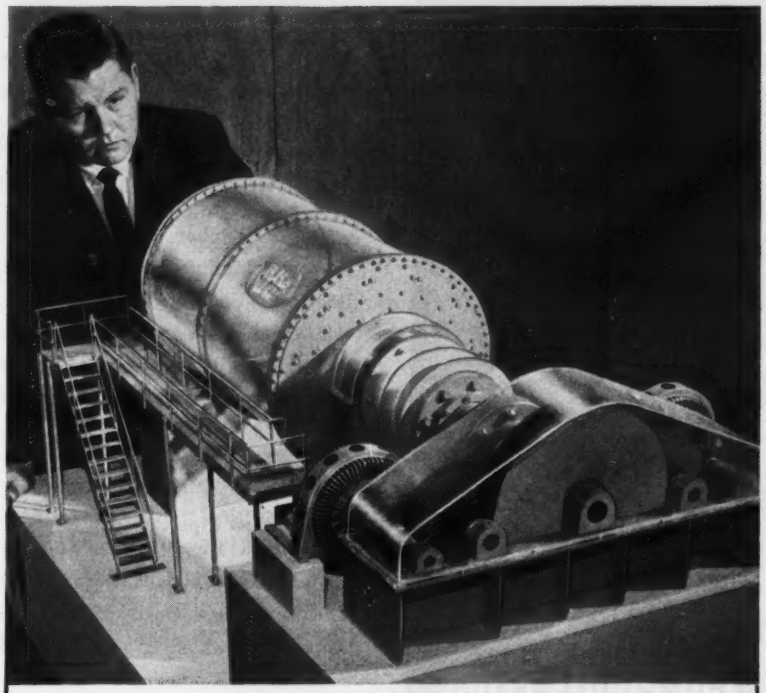
Q

Quest For Tomorrow	880

R

RKL Controls, Inc.	1388-90
Radiation Applications Inc.	1438
Rapids Machinery Co., Inc.	1162
Raybestos-Manhattan, Inc.	820
Red Jacket Co., Inc.	975
Reinhold Publishing Corp.	86

ideas and news:
at the Chem Show...Booth 636



See a MILL DRIVE that gives 98%-plus efficiency

In recent full-load demonstrations, the TWINDUCER drive (which divides the mill load electrically) showed efficiencies of 98.5 percent. This development is just one product of Allis-Chalmers unmatched grinding mill experience. You can rely on A-C for the application knowledge . . . the design and manufacturing abilities that produce superior equipment for added efficiency.

See us at the Chem Show for complete information on ANY grinding or crushing problem. Or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. A-1564

Get a first-hand look at these other A-C products:

vibrating and gyratory screens • ELECTRI-CAND leakless pumps • ACAP adjustable pumps • new chemical pump line • SUPER-SEAL motors • corrosion-proof pushbutton stations • new rubber-seated, pneumatically operated wafer valve.

Twinducer, Electri-Cand, ACAP and Super-Seal are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Check 1535 opposite last page.

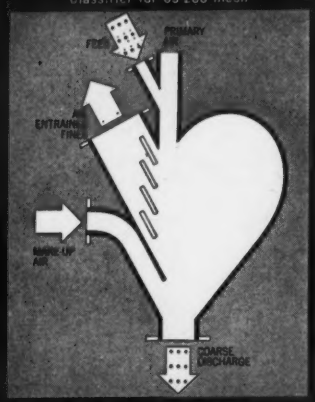
size or dedust any dry material with a

buell

classifier

- low power requirements
- instant cut point adjustment
- minimum maintenance
- operate in series for several fractions

Buell Gravitational-Inertial Classifier for 65-200 mesh



Cut Points From 20 mesh to 20 microns

THERE'S A BUELL CLASSIFIER FOR ALMOST ANY MATERIAL for details—mail the coupon

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123 William St., New York 38, N. Y.

Please send details on Buell Classifiers.

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Cut points desired_____.

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Company_____

Address_____

City_____ Zone____ State_____

Other Buell-Norblo Products: electric precipitators ■ cyclones ■ bag collectors ■ combination systems

"See our exhibit at the Chem Show"
Check 1536 opposite last page.

COMPANY DIRECTORY

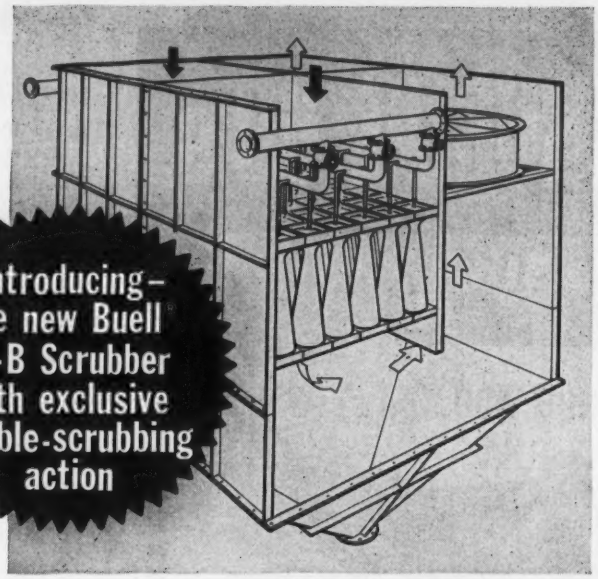
Name of Exhibitor	*Booth No.*
Edw. Renneburg & Sons Co.	1012
Republic Lead Equipment Co.	111
Research-Cottrell, Inc.	1404
Research Controls, Inc.	366
Resistoflex Corp.	893-895-897
Rheem Manufacturing Co. Container Division	153
Richardson Scale Company	21
Rieke Metal Products Corp. Multi-Meter Corp., Div.	1033
Rietz Manufacturing Co.	1231
Robbins & Myers, Inc. Moyno Pump Div.	1254
Robertshaw-Fulton Controls Co. Fulton Sylphon Div.	1293
Rockwell Manufacturing Co.	69
Rockwood Sprinkler Co.	1238-71-73
Ronningen-Petter Co.	1113
Roy E. Roth Co.	100
Charles Ross & Son Co., Inc.	994-996

S

Saran Lined Pipe Co. Michigan Pipe Co.	1277-79
C. G. Sargent's Sons Corp.	817
The Scam Instrument Corp.	1232
James F. Scanlon	1440
Schueler & Company Schuco Scientific Div.	345
Schutte and Koerting Co.	61
Schutz-O'Neill Company Parten Machinery, Div.	1400
Scientific Development Co.	382
Scientific Glass Apparatus Co., Inc.	332
Screen Products, Inc.	1091
Sealol, Inc.	1281
Selas Corp. of America	979-981
Sellers Injector Corporation	1202
Separations Engineering Corp.	37
Sethco Mfg. Corp. Sethco Sales Corp. Div.	293
Sharples Corporation	485
Fletcher Div.	459
T. Shriver & Company, Inc.	473
Sier-Bath Gear & Pump Company, Inc.	806
Sigmamotor, Inc.	1099
Simon-Carter Co.	898
The Orville Simpson Company	68
W. W. Sly Manufacturing Co.	73
A. O. Smith Corporation	596
Snyder Corporation Arthur Colton Co.	98
Ivan Sorvall, Inc.	316
Southwestern Engineering Co. Vibro-Equipment Div.	1250-52
Sparkler Manufacturing Co.	56
The Spencer Turbine Co.	1392
D. R. Sperry & Company	1362
Spray Engineering Co.	1434
Spraying Systems Company	914
Sprout, Waldron Company, Inc.	846-847-848
Stainless Products Corp.	1158
StandardOverall Co.	1436
Standard Steel Corp.	122
Stapling Machines Co. Package Research Laboratory	1261-63
Star Tank & Filter Corp.	233
Stauffer Chemical Co.	928-934
Wm. Steinen Manufacturing Co. Industrial Nozzle Div.	1194-96
Sterling-Fleischman, Inc.	1077
F. B. Stevens, Inc. Clark-Cooper Div.	1138-42
Herman H. Sticht Co., Inc.	1280
Stockham Valves & Fittings	1123-25
Stoffel Seals Corp.	1227
H. L. Stoker Company	1049
F. J. Stokes Corp.	67-38
Strahman Valves, Inc.	815
Straight Line Filters, Inc.	1407
The Strong-Scott Mfg. Co. Industrial Equipment Div.	1274-76-78
Sturtevant Mill Company	421
Sulzer Bros., Inc.	1455
The Superior Electric Co.	810
Sutton, Steele & Steele, Inc.	37
Swepco Tube Corp.	850

T

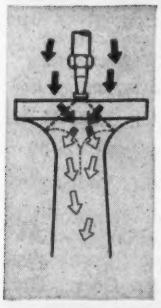
Taylor Instrument Companies	104
Taylor, Stiles & Co.	1347
Technical Fabricators, Inc.	1372
Technicon Controls, Inc.	320
Temperature Engr. Corp.	1392
Terriss-Consolidated Industries	1313-15-17



introducing—
the new Buell
W-B Scrubber
with exclusive
double-scrubbing
action

Service-proved in applications around the world, the new Buell W-B Scrubber is now available for sub-micron dust removal jobs in this country. This newest multi-venturi wet collector removes over 99% of dust as small as 0.05 microns. Licensed under the famous Waagner-Biro patents, the new Buell W-B Scrubber offers several distinct benefits over other wet collectors. The most important are discussed below. ■ There are other operating advantages, too, including low water requirements, and case-hardened venturi throat to resist erosion. But why not check into the Buell W-B Scrubber for your own application? For details, write Buell Engineering Co., Inc., Dept. 11-K, 123 William St., New York 38, N. Y.

■ cyclones · electric precipitators · bag collectors · combination systems · classifiers · venturi scrubbers.

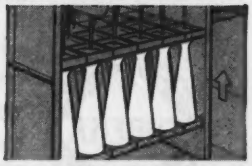


double-scrubbing action Exclusive! Water is introduced ahead of the venturi, which forms two distinct cones for gas to pass through

typical process industry uses sulphuric acid mist—detergent fumes—lime dust—catalyst dust—fly ash—fluorine compound dusts—hydrochloric acid fumes—cement dust—tar—acetic acid fumes—phosphoric acid mist—titanium dioxide dust—salt cake dust.

low power This special design achieves the desired efficiencies with low pressure drops; thus, requires minimum power

■ **high efficiency** The Buell W-B Scrubber offers efficiencies for given conditions higher than any similar system.



any capacity The new Buell W-B Scrubber is made up of multiple venturi tubes—each a standard, readily-stocked item. Capacity for your application is arranged simply by designing for the proper number of venturi tubes.

Member Industrial Gas Cleaning Institute

buell Norblo

See a working model of the Buell W-B Scrubber at Booths 1189 and 1193 at the Chemical Show Nov. 27-Dec. 1 New York Coliseum

Check 1537 opposite last page.

IN THE CRUCIAL 60's

PUT NEW PRECISION IN YOUR MIXING

THIS SANITARY MIXER is typical of Eureka equipment being used throughout the processing industries. Custom-engineered for the Block Drug Company of Jersey City, N. J. in blending Polident cleansers, the unit is teamed with a Eureka Sifter and a Sanitary Screw Conveyor. Features include stainless steel construction, a specially-designed mixing cylinder, and extremely compact but powerful drive components.

EUREKA

AMERICAN MADE... YOUR BEST BUY

YOU CAN ACHIEVE new standards of accuracy, cleanliness and economy in all your blending, aspirating, size reduction, weighing, packing and conveying operations, too...with precision S. Howes equipment.

WRITE FOR CATALOG giving details of the full line of Eureka equipment for the processing industries.

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GET FAST ACTION

CALL COLLECT, YELLOWSTONE 4-2611, Silver Creek, N. Y. for prompt, personal attention to any request.

Check 1538 opposite last page.

COMPANY DIRECTORY

Name of Exhibitor	*Booth No.*
Texas Instruments Inc. Metals & Controls, Inc., Div.	841
Thermal Research & Engineering Corp.	1349-51
Thermon Mfg. Co., Inc.	1207-09
Thomas Engineering Co., Inc.	1406
Thompson Ramo Wooldridge Inc. TRW Computers Co., Div.	176
Toledo Scale Corporation Toledo Scale Div.	157
Torit Manufacturing Co.	1446
The Torsion Balance Company	328
Tower Iron Works, Inc. Process Equipment Div.	977
Transport Leasing Co.	1129
Tranter Manufacturing, Inc. Platecoil Div.	10
Trent, Inc.	195
H. O. Trerice Co.	1287
Tri-Kris Co., Inc.	1447-49
Tri-Homo Corporation	191
Tube Turns Plastics, Inc.	172
The W. S. Tyler Co.	574

U

Uehling Instrument Co.	364
Ulrich Manufacturing Co. Bump Pump Div.	1074
Union Carbide Corp. Linde Co., Subs.	1127
National Carbon Co. Div.	460
Union Industrial Eqpt. Corp.	1076
Union Process Co.	1329-31
Union Steel Corporation	840
United Box & Lumber Co.	1085
U. S. Electrical Motors, Inc.	837
United States Filter Co.	1139-41-43
U. S. Steel Corp. National Tube Div.	669
U. S. Stoneware Co. Alite Div.	111
Universal Oil Products Co. Catalytic Combustion Corp., Div.	1255

V

Vac-U-Max	1195-97
Valcor Engineering Corp.	1283
D. Van Nostrand Co., Inc.	866
Vapor Corporation	1028
Velan Engineering Companies	1300
Velcro Corp.	1417

Name of Exhibitor	*Booth No.*
Vibra Screw Feeders Inc.	1296-98
Vibro-Plus Products, Inc.	1393
Victaulic Co. of America	1190-92
Viking Pump Company	1071
Henry Vogt Machine Co.	124-126
J. H. H. Voss Co., Inc.	1224
W	
Wallace & Tiernan, Inc.	686
Walworth Company	26
Charles F. Warrick Co.	1343
Waters Associates	1425
Waukesha Foundry Co.	1387-89
The Welch Scientific Co.	205
The Welsbach Corp. Ozone Processes Div.	1410
Western Machinery Co. Wemco Div.	1044-46
The Western States Machine Co. Chemical Machinery Div.	1206-08-10
West Virginia Pulp and Paper Co. Industrial Chemical Div.	944
Westinghouse Electric Corp. Industrial Products Div.	510
What's New In Plant-Engineering Equipment	880
Frank Wheatley Pump & Valve Mfg.	1415-32
White Sewing Machine Corp. Strong Div.	1121
Whiting Corporation Swenson Evaporator Co., Div.	93
Edwin L. Wiegand Co.	13
Williams Patent Crusher & Pulverizer Co.	161
Wilmot Castle Co.	1029
Wood Conversion Company Sonic Engineering Corp., Subs.	1181
Worcester Valve Co., Inc.	1164-66
Worthington Corp. Mason-Neilan, Div. Standard Pump Div.	545
Y	
Yarnall-Waring Co.	81
York Corporation	1358-60
Otto H. York Co., Inc.	85
The Young Machinery Co., Inc.	833
Youngstown Sheet & Tube Co. Fibercast Co., Subs.	870
Yuba Consolidated Industries, Inc.	882-884-886

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● Positive grip of pipe ends
● Low cost couplings and fittings
● Join standard or light wall carbon or stainless steel, aluminum and other piping materials
CUT COSTS WITH OVER 1100 VICTAULIC ITEMS FOR BETTER AND EASIER PIPING
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Plug Valves
For complete information on any Victaulic product, write:
VICTAULIC COMPANY OF AMERICA
P.O. Box 509, Elizabeth, N.J.

"See our exhibit at the Chem Show"

PRODUCT GUIDE

Complete floor plans on pages 116 to 121

Locate the product category of interest to you. Companies exhibiting in each classification are listed in order, by booth number.

CHEMICAL MATERIALS

Acids

Stauffer Chemical Co. 928-34
Oakite Products, Inc. 1072

Agricultural Chemicals

Ansul Chemical Company 95
Metalsalts Corporation 933

Alkalis

Stauffer Chemical Co. 928-934

Anti-oxidants & Preservatives

Ansul Chemical Company 95
Metalsalts Corporation 933
Continental Oil Company
Petrochemical Dept. 940
Metal Hydrides Inc. 964

Catalysts

Engelhard Industries, Inc. 192-196-225
Aluminum Company of America
Chemicals Division 470
Abbott Laboratories 918
Metal Hydrides Inc. 964
Universal Oil Products Co. 1255
Catalytic Combustion Corp., Div.
Oxy-Catalyst, Inc.
Industrial Department 1413

Minerals & Mineral Products

Great Lakes Carbon Corp. 204
Mining & Mineral Products Div.
Great Lakes Carbon Corp.
Dicalite Department 204
Johns-Manville 415-645
Aluminum Company of America 470
Chemicals Division
Stauffer Chemical Co. 928-934
The Eagle-Picher Co.
Insulation Div. 1167-69

Paint Chemicals & Pigments

Great Lakes Carbon Corp. 204
Mining & Mineral Products Div.
Johns-Manville 415-645
Metalsalts Corporation 933

Plastics & Resins

General American Transportation
Corp. Plastics 436-442
Chemplast, Inc. 808
Crane Packing Company 900-902
Hercules Powder Company
Polymers Division 916
Michigan Chemical Corporation 942
The Johnson Corp. 1128-30
Eberly Dynamics, Inc.
Protective Plastic Co. 1411

Rubber Chemicals

Abbott Laboratories 918
Michigan Chemical Corporation 942

Specialty Chemicals

Ansul Chemical Company 95
Aluminum Company of America 474
Pangborn Corp. 681
Norcross Companies, Kem-Feed
Division 868
Abbott Laboratories 918
General Dynamics Corporation
Liquid Carbonic Division 924-926
Metalsalts Corporation 933
Continental Oil Company
Petrochemical Dept. 940
Michigan Chemical Corporation 942
Oakite Products, Inc. 1072
American Hydrotherm Corp. 1174-76

Surface-active Agents

Continental Oil Company
Petrochemical Dept. 940

ENGINEERING AND CONSTRUCTION

Chemical Construction Corp. 952
Crawford & Russell Inc. 1000

FLUIDS HANDLING

Packings & Seals

Parker Seal Co. 431
Raybestos-Manhattan, Inc. 820
Keasbey & Mattison Co. 822
Crane Packing Company 900-902
Pennsylvania Fluorocarbon Co.,
Inc. 969
Ethylene Corp. 971
Durametallic Corp. 1216
Conax Corp. 1230
John L. Doré Co. 1295-97
Beemer Engineering Company 1416
The Anchor Packing Company 1173-75
Saran Lined Pipe Co.
Michigan Pipe Co. 1277-79
Sealol, Inc. 1281
Clayton Mark & Company
Forged Steel Products Div. 1435

Pipe, Tubes, Fittings & Steam Traps

The Carpenter Steel Company
Alloy Tube Division 16
Alloy Steel Products Company
Walworth Company 22
Walworth Company 26
Parks-Cramer Company 55
Lead Lined Iron Pipe Co. 70
Yarnall-Waring Co. 81
Cooper Alloy Corp.
Vanton Pump Div. 103
U. S. Stoneware Co.
Alite Div. 111
Henry Vogt Machine Co. 124-126
Falls Industries, Inc. 131
Corning Glass Works
Technical Products Div. 134
Tube Turns Plastics, Inc. 172
Engelhard Industries, Inc.
Amersil Quartz Div. 192-196-225
Macalaster Bicknell Corp. 314
Ampco Metal, Inc. 412
Johns-Manville 415-645
Parker-Hannifin Corp.
Parker Fittings & Hose Div. 431
Barco Manufacturing Company
Industrial Aircraft Div. 439
Aluminum Company of America 474
Haveg Industries, Inc. 546
Grinnell Company, Inc. 566
A. O. Smith Corporation 596
U. S. Steel Corp.
National Tube Div. 669
Flowline Corp. 805
Lead Industries Association 816
Raybestos-Manhattan, Inc. 820
Union Steel Corporation 840
Crawford Fitting Company 844
Swepco Tube Corp. 850
Chemiquip Company 854
Youngstown Sheet & Tube Co. 870
Youngstown Sheet & Tube Co.
Fibercast Co., Subs. 870
Monarch Mfg. Works, Inc. 881
FMC Corporation 888-890-892
Chiksan Company, Div.
Du Verre, Inc. 889, 891
Resistoflex Corp. 893-895-897
Cherry-Burrell Corp. 913
Spraying Systems Company 914
Kennametal Inc. 963
Pennsylvania Fluorocarbon Co.,
Inc. 969
Ethylene Corp. 971
Horace T. Potts Co.
Speedline Fittings Div. 980
Babcock & Wilcox Co.
Tubular Products Div. 1002-06

CARBON DIOXIDE CAN BENEFIT YOUR CHEMICAL PROCESSING

Liquid CO_2 is as versatile as your requirements. You can use it as a gas, as a solid, or in the convenient Liquiflow* form to serve your plant completely, dependably, economically. Whether you use a carbon dioxide as a refrigerant . . . a pressure medium . . . a weak acid . . . a reactant . . . a raw material . . . or as an inert atmosphere, you can depend on Liquid CO_2.

**Liquid Carbonic's low pressure CO_2 system.*

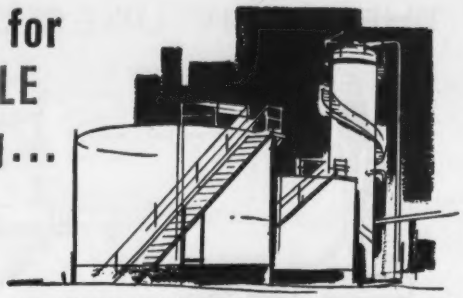
Over 100 Liquid plants and warehouses assure you of continuous supply. Scores of trained technicians are at your call with updated know-how. Wherever you are, wherever you build, Liquid Carbonic is just around the corner with unbeatable service. Liquid Carbonic—the world's largest producer of CO_2.

Be sure to see Liquid Carbonic's display at the Chem Show, Nov. 27-Dec. 1, Booth 924

LIQUID CARBONIC
DIVISION OF **GENERAL DYNAMICS**
Dept. C, 135 S. LaSalle St., Chicago 3, Ill.
In Canada: Liquid Carbonic Canadian Corporation, Ltd.
8375 Mayrand St., Montreal 9, Quebec
LIQUID CARBONIC'S COMPLETE LINE INCLUDES: OXYGEN, NITROGEN, ARGON, ACETYLENE, NITROUS OXIDE, HYDROGEN, HELIUM AND GAS MIXTURES

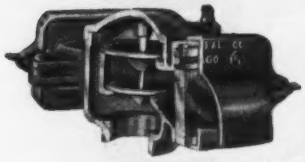
Check 1540 opposite last page.

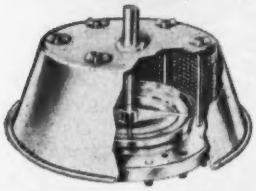
PROTECTOSEAL for SAFE FLAMMABLE LIQUID Handling... Tank Storage, Processing, Testing, Research



The Protectoseal Line of storage tank vents and fittings includes operating, emergency, and special purpose equipment to meet virtually any requirement of fire prevention and vapor control. In providing proper fire and explosion protection for over 35 years Protectoseal Engineers always consider the operating and maintenance problems of corrosion, sublimation, valve pressures, conservation, cleaning of flame arresters, or other situations peculiar to a given installation.

Two widely used units are illustrated here under the following headings:





CONSERVATION VENTS

Designed with flame arrester structure *outside* the vent housing. Advantages: (1) In event of ignition, vent burns at flame arrester—not the valves. Prevents warping and malfunction; (2) Flame arrester plates not continuously exposed to possible corrosive vapors; (3) Flame arrester structure keeps dirt and other foreign matter away from valves which might cause improper valve seating; (4) Self-draining of condensate. Protectoseal conservation Vents are UL and FM approved, and are made in a wide range of sizes.

EMERGENCY RELIEF VALVES

Provide emergency relief capacity beyond that furnished by operating vent. Free-lifting, self-closing valve is designed to relieve at 1 ounce/sq. in. settings up to 10 ounces/sq. in. can be provided. Metal-to-metal seat; non-metallic seat available. Coarse mesh screen prevents entry of foreign matter. Weatherhood protects entire valve. Emergency equipment available in complete range of sizes to 20½ inches.

Write for Protectoseal "Blue Book" — a complete and informative reference guide to storage tank equipment selection, design, and operation.

LABORATORY EQUIPMENT

OVAL SHAPE SAFETY STORAGE AND DISPENSING CANS — require less shelf space, permit storage of five containers in space normally required for three round cans. Flame arrester protection at all openings. Convenient handles, automatic pressure relief, liquid tight seals, available in stainless steel, Terne Plate.

SAFETY TILT CAN ASSEMBLIES — easily tilted for accurate, dripless dispensing from self-closing faucet. Can returns to vertical position when released. Flame arresters at all openings. Also available for wall mounting.

LIQUID DISPOSAL CANS — large receiving spout for easy waste liquid disposal. Cap opens wide, may be locked open. Stainless steel or Terne Plate body. Flame arrester protection at receiving opening. Automatic pressure relief, leak-proof cap seal. 2 sizes: 2 gallons, 5 gallons.

STAINLESS STEEL DRUM FAUCETS — self positioning — may be screwed into drum bung opening and spout swivels to dispensing position. Automatic closing. Dripless valve with Teflon Seal. Flame arrester protection. Available for ¾" NPT opening.

Write for Protectoseal "Red Book" — contains flammables engineering fundamentals and guide to equipment selection.

THE PROTECTOSEAL COMPANY

1932 South Western Avenue • Chicago 8, Illinois

"See our exhibit at the Chem Show"

PRODUCT GUIDE

Name of Exhibitor	*Booth No.*
IBM, Service Bureau Corp., Subs.	1070
Lock Joint Pipe Co.	
Oscar Davis Co., Inc., Subs.	1078
Carl Buck & Associates	1083
Miller Products Company, Inc.	1092
Kraloy/Chemtrol Co.	1111
White Sewing Machine Corp.	
Strong Div.	1121
Stockham Valves & Fittings	1123-25
Crucible Steel Company of America	
Titanium Division	1151-53-55-57
Ever-Tite Coupling Co., Inc.	1159
Hydril Company	1188
Victaulic Co. of America	1190-92
Wm. Steinen Manufacturing Co.	
Industrial Nozzle Div.	1194-96
Carlon Products Corp.	1198
The Nalge Co., Inc., American	
Vulcathene, Division	1201

During and after the show

Want to check for things you might have missed? This month's issue of CHEMICAL PROCESSING magazine contains descriptions of the show's high points, tagged for easy spotting. Be sure and look it over.

Alloy Products Corp.	1205
Thermon Manufacturing Co., Inc.	1207-09
Conax Corp.	1230
Keystone Valve Corp.	1236-68
International Basic Economy Corp.	
The V. D. Anderson Co., Div.	1265
Continental-Emsco Co.	
Industrial Sales Div.	1270
John L. Doré Co.	1295-97
A. P. V. Company, Inc.	1303
Armstrong Machine Works	1359
Beckley, Haltom & Hickman Services Corp.	1363
Morland Associates	1383
Spray Engineering Co.	1434
Clayton Mark & Company	
Forged Steel Products Div.	1435
Barnes & Jones Inc.	1439
The Kuhns Brothers Co.	1444

Pumps

Industrial Filter & Pump Mfg. Co.	15
Komline Sanderson Engineering Corp.	25
The LaBour Company, Inc.	42
Manton-Gaulin Manufacturing Company, Incorporated	51
Schutte and Koerting Co.	61
Lead Lined Iron Pipe Co.	70
The Eimco Corp.	80
Cooper Alloy Corp.	
Vanton Pump Div.	103

GENERAL AMERICAN AIRSLIDE® CARS

Here's measurable endorsement of General American Airslide Cars for shipping dry powdered or granular materials. Bulk shipments are safe from contamination. Unloading by any means of conveying is easy and economical—particularly for those materials which tend to bridge or pack in transit. If you ship flour, sugar, starch or similar materials—it will be well worth your while to find out how your costs can be cut and performance improved with Airslide cars.

MORE THAN 5000 IN SERVICE!

Airslide® and Dry-Flo® Car Division

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street • Chicago 3, Illinois
Offices in principal cities

"See our exhibit at the Chem Show"

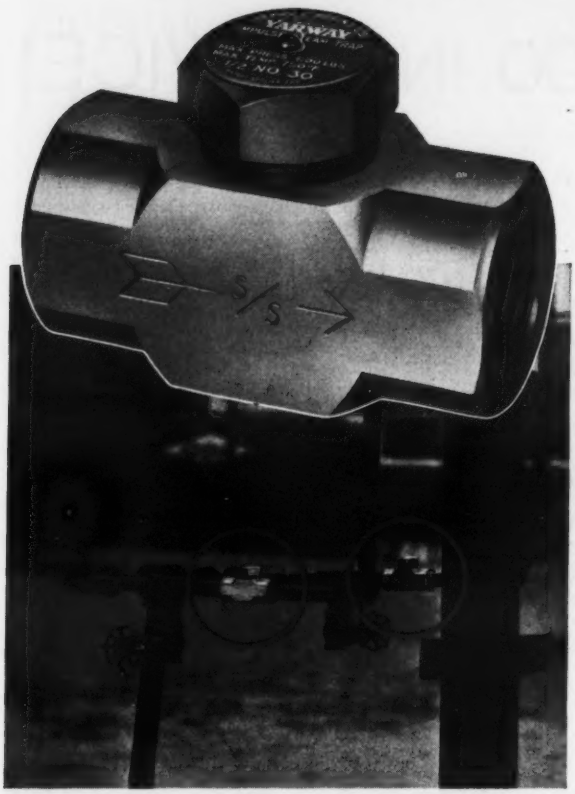
Check 1542 opposite last page.

YARWAY news briefs

from **Yarnall-Waring Company,** *Philadelphia 18, Pa.*

BRANCH OFFICES IN 19 UNITED STATES CITIES • SALES REPRESENTATIVES THROUGHOUT THE WORLD
STEAM TRAPS STOCKED AND SOLD BY 270 LOCAL INDUSTRIAL DISTRIBUTORS

YARWAY SERIES 30 IS THE STEAM TRAP FOR PEAK EFFICIENCY



Two Yarway Series 30 traps on tracer lines from a loading station to polystyrene storage tank at the Midland Division of The Dow Chemical Co., Midland, Mich. Steam pressure is 150 pounds.

on tracer lines, main drips, meter boxes and other steam equipment

Yarway Series 30 Impulse Steam Trap has won enthusiastic acceptance and scored outstanding success on those hundreds of applications where condensate is handled in moderate amounts. Here's why:

- Economy of operation, with closer condensate control
- Longer service life, with lever action reducing impact on valve seat
- Lower maintenance, with easily and quickly replaceable seat and disc
- High quality, all stainless steel—combined with a new low cost

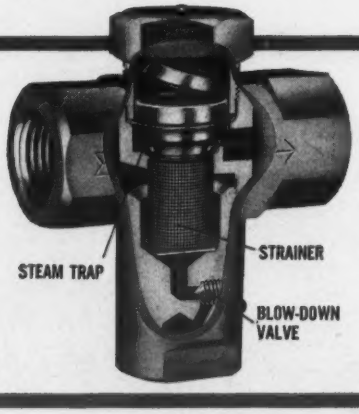
Here are a few typical user experiences:

TEXAS REFINERY—*Been using ½" No. 30's on drip legs to steam lines for 6 months. "No troubles whatsoever."*

PENNSYLVANIA TIRE MFR.—*Gradually replacing all traps on tire molds with Yarway No. 30's. "Amazed at their performance."*

MISSOURI STEEL PLANT—*Tested Yarway No. 30's against competitive traps, with result "Yarway No. 30 now standard on all main steam header drips."*

So it goes in plant after plant. Why don't *you* try Yarway Series 30 Traps? Available in ⅜" or ½" size; pressures 8 to 600 psi. Your nearby Industrial Distributor carries them. Write for his name.



NEW! COMPACT COMBINATION

NEW SERIES 130 steam trap combines a Series 30 trap, a strainer, and blow-down valve *all in one compact unit*—with these advantages:

- Saves space
- Saves weight
- Saves installation costs
- Saves on maintenance

Stainless steel construction, good for all pressures 8 to 600 psi.

Your Yarway distributor has SERIES 130 traps. Try one today—or write for new Bulletin T-1743-B.

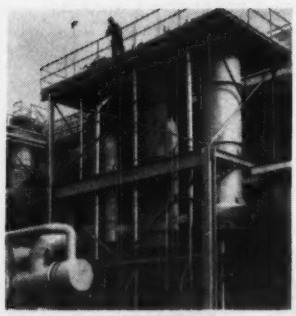
"See our exhibit at the Chem Show"

Check 1543 opposite last page.

NOW YOU CAN CONCENTRATE WET PROCESS PHOSPHORIC ACID TO A GUARANTEED 72% P_2O_5

Spectacular performance by Kelly Concentrators, now being manufactured by General American, has set new standards in chemical and food processing. An outstanding example is the increase of P_2O_5 in wet process phosphoric acid concentration from 54% to 72%—a gain of 33⅓%.

The same kind of performance can be had with other chemicals and foods. These concentrators, using the falling film principle, perform equally well at high and very low temperatures, control scaling, inhibit corrosion, prevent damage to heat-sensitive materials, and can recover both concentrate and distillate.



In addition to concentrators, General American offers virtually every type of process equipment. Let us help you solve your food or chemical processing problems.

See our equipment at the Chemical Show, Booths 435, 436, 442, 446, 495.

Process Equipment Division

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South La Salle Street · Chicago 90, Illinois

Offices in principal cities

Check 1544 opposite last page.

Wire Cloth—Filter Cloth

Available from stock in all alloys, all weaves, all meshes, up to 244" wide—in rolls or cut to size. "Micromesh" ultrafine strong stainless filter cloth for retention of particles from 25 to 5 microns. Also backing and spacing cloth and screens.

Rescreening Service

On tension rings for vibrating screens.

Neva-Clog

Double layer, perforated, alloy sheet medium—smooth, strong, rigid—for diatomite filters, centrifuges, ion exchangers, carbon towers, dust and fume control.

Filter Leaves

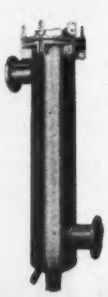
"Rim-Lok" and other Multi-leaves for pressure filters; standard leaves for stationary and rotary filters.

Strainers

"Individualized" strainer elements and housings, designed and built by Multi-Metal to meet process needs not served by available standard units.

Custom Fabrication

Requiring wire cloth elements: screens for filter presses, tubular filter elements, cylinders, baskets, process unit components, etc.



Write for Catalog 57.

MM MULTI-METAL WIRE CLOTH CO., INC.
1356 GARRISON AVENUE, NEW YORK 59, N. Y.

"See our exhibit at the Chem Show"
Check 1545 opposite last page.

PRODUCT GUIDE

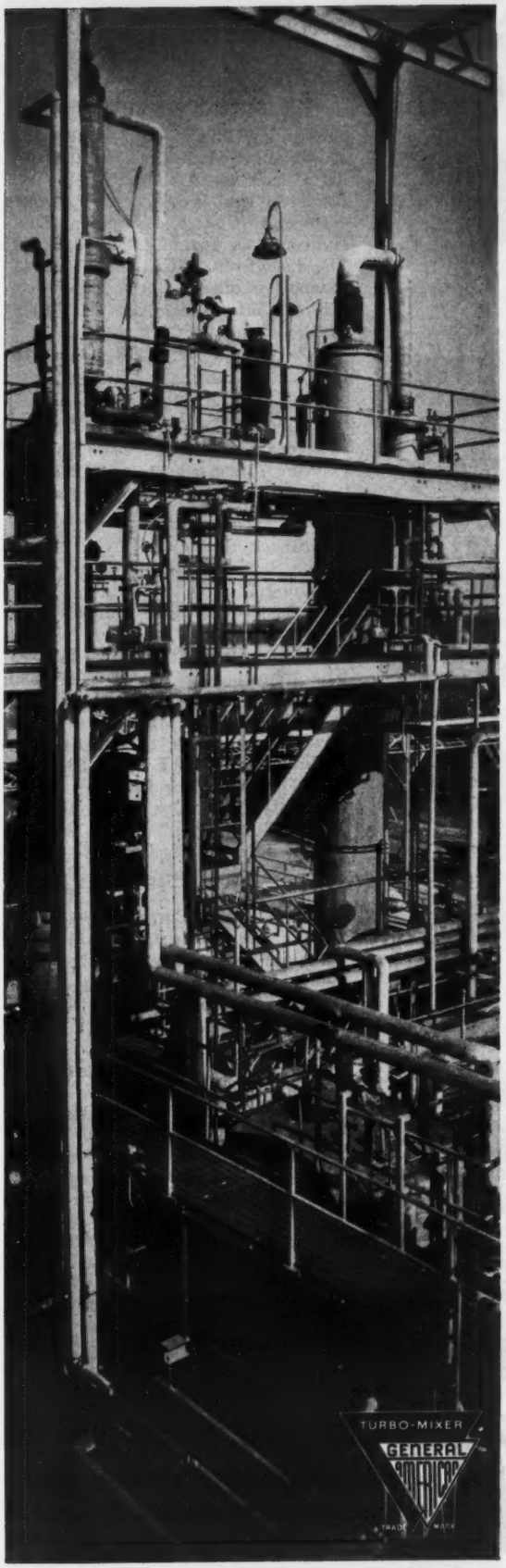
Name of Exhibitor	*Booth No.*
Ingersoll-Rand Co.	128
American Meter Company, Inc. Pump Division	150
The Welch Scientific Co.	205
Sethco Mfg. Corp. Sethco Sales Corp. Div.	293
Autoclave Engineers Sales Corp.	346
Alsop Engineering Corporation	381
Ampco Metal, Inc.	412
American Instrument Co., Inc.	445
Union Carbide Corp. National Carbon Co., Div.	460
T. Shriver & Company, Inc.	473
The Duriron Co., Inc.	520-532
Dorr-Oliver Inc.	531
Worthington Corp. Standard Pump Div.	545
Allis-Chalmers Manufacturing Co. Industries Group	636
Lapp Insulator Co. Process Equipment Div.	696
Sier-Bath Gear & Pump Company, Inc.	806
FMC Corporation Peerless Pump, Hydrodynamics Div.	831
The Galigher Company	843
Lawrence Pumps, Inc.	852
Cherry-Burrell Corp.	913
Bel-Art Products	937
Economy Faucet Co. Eco Engineering Co.	978
Jabsco Pump Co.	1016-18
Western Machinery Co. Wemco Div.	1044-46
Viking Pump Company	1071
Ulrich Manufacturing Co. Bump Pump Div.	1074
Carl Buck & Associates	1083
Miller Products Company, Inc.	1092
Sigmamotor, Inc.	1099
The Madden Corporation	1136
Wood Conversion Company	1181
Sonic Engineering Corp., Subs.	

"Before we get too looped, lets make the rounds of a few booths, eh?"

Name of Exhibitor	*Booth No.*
The Corley Co., Inc.	1204
Thermon Manufacturing Co., Inc.	1207-09
Dean Brothers Pumps, Inc.	1245-47-49
Robbins & Myers, Inc. Moyno Pump Div.	1254
Mission Manufacturing Co.	1258-60
Saran Lined Pipe Co. Michigan Pipe Co.	1277-79
Goulds Pumps, Inc.	1288-90-92-94
Hills-McCanna Co.	1307-09
Goodyear Pumps Inc.	1344
Melrath Canned Pumps, Inc.	1347
Ingersoll-Rand Co. The Aldrich Pump Co., Subs.	1375-77
Benson Laboratories, Inc.	1381
Waukesha Foundry Company	1387-89

Valves

Alloy Steel Products Company Walworth Company	22
Walworth Company	26
The LaBour Company, Inc.	42
Parks-Cramer Company	55
Rockwell Manufacturing Co.	69
Lead Lined Iron Pipe Co.	70
Cooper Alloy Corp. Vanton Pump Div.	103
Henry Vogt Machine Co.	124-126
The Wm. Powell Co.	133
Hoke Inc.	163
Tube Turns Plastics, Inc.	172
Autoclave Engineers Sales Corp.	346
Jenkins Bros.	409
Crane Co. Industrial Products Group	422
American Instrument Co., Inc.	445
Union Carbide Corp. National Carbon Co., Div.	460
The Duriron Co., Inc.	520-532
Worthington Corp. Mason-Neilan, Div.	545
Worthington Corp. Standard Pump Div.	545
Grinnell Company, Inc.	566
Lapp Insulator Co. Process Equipment Div.	696
Automotive Rubber Company, Inc.	802-804
Strahman Valves, Inc.	815
The Galigher Company	843
Crawford Fitting Company	844
ACF Industries, Inc. W-K-M Division	847
Continental Manufacturing Co.	876-1093
Monarch Mfg. Works, Inc.	881
DeZurick Corp.	907
Bel-Art Products	937
Delaware Barrel & Drum Company, Inc.	953-955
Red Jacket Co., Inc.	975
Economy Faucet Co. Eco Engineering Co.	978



TRY THIS SIMPLE QUIZ ABOUT THE **RDC** COLUMN

1. *R.D.C. stands for*

☐ a) Rapid Dispersion Column
☐ b) Recycle Displacement Column
☐ c) Rotating Disc Contactor

2. *RDC Columns are made by*

☐ a) 6 different manufacturers
☐ b) by one manufacturer
☐ c) by 10 manufacturers

3. *The RDC column has been used for*

☐ a) Separation of Hafnium from Zirconium
☐ b) Caustic extraction of acids from organics
☐ c) Caffein and vanillin extraction

4. *The RDC column can be used for*

☐ a) liquid-liquid extraction
☐ b) liquid-solid extraction
☐ c) liquid-slurry extraction

5. *The RDC column has which of these advantages*

☐ a) High volumetric efficiency
☐ b) No interstage coalescing or external settling
☐ c) Low power requirements

Answers

1. (C) Rotating Disc Contactor.

2. (B) RDC columns are made for the process industries exclusively by General American, and on a non-exclusive basis for the petroleum industry.

3. (A), (B) and (C). For a complete list of typical systems in service, contact General American.

4. (A), (B) and (C) again. The RDC column is one of the most versatile tools available for extraction processing.

5. (We did it again—all three are correct).

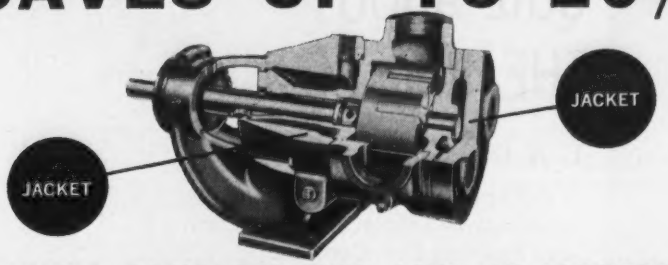
If you'd like more information on the RDC column and the many advantages it offers, send for Bulletin T-1159. You'll find it pays to plan with General American.

Process Equipment Division—Turbo-Mixers
GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South LaSalle Street • Chicago 3, Illinois
Offices in principal cities

See our equipment at the Chemical Show, Booths 435, 436, 442, 446, 495.

Check 1546 opposite last page.

NEW DESIGN SAVES UP TO 20%



VIKING'S COMPLETE NEW LINE OF JACKETED STAINLESS STEEL* PUMPS

*Also other alloys—nickel, Monel, steel, Ni-Resist, etc.

Now you save money on *new* type stainless steel* Viking Pumps and still get that same rugged, heavy-duty service. The new, improved design makes it possible. All parts coming in contact with the material handled are stainless steel or other specified alloy—other parts are cast iron. Its unique design incorporates a jacket chamber around the back of the pump, around the mechanical seal or packing chambers and over the head of the pump. This chamber permits cooling or heating of the liquid being pumped.

Mounting dimensions remain the same as Viking's previous compact line of alloy heavy-duty pumps, and without increased size for jacketing.

Six sizes from 10 to 110 G.P.M. are available. Pumps operate at full speed handling light liquids—at reduced speeds for heavy, viscous liquids. Pumps suitable for pressures up to 50 P.S.I. handling non-lubricating liquids—100 P.S.I. on lubricating liquids. Completely self priming with positive discharge.

50 YEARS

For additional information, send today for folder SP 537CC

VIKING PUMP COMPANY

Cedar Falls, Iowa, U.S.A. In Canada, It's "Roto-King" Pumps
See Our Unit in Chemical Engineering Catalog
(See this new line of pumps at Viking's booth #1071, 28th Exposition of Chemical Industries, Coliseum, New York, N.Y., November 27-December 1. Pumps available in February.)

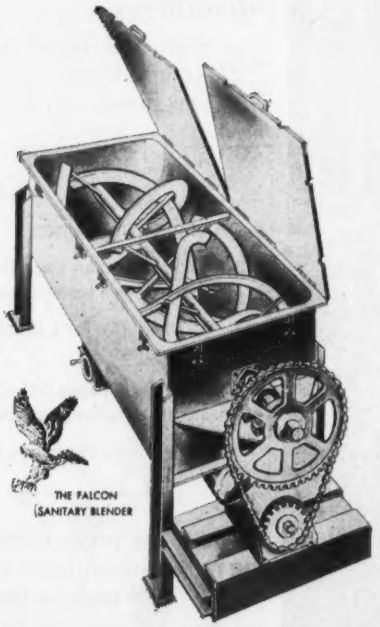
Check 1547 opposite last page.

SEE the NEW

FALCON BLENDER

Booths 1418-1420
at the CHEM-SHOW

Engineered with ALL the features, production men want; *All Rounded Interiors, *Welded Steel Construction; *Quickly demountable for Change over of material; *Approved Sanitary construction; In Stainless or Mild Steel; *With or Without Jackets; *Universally used in many industries.



Make Your Visit to New York, a Double-Header

Visit First's Permanent Exhibition of Choice Equipment for the Chemical and Processing Industries. Inspect an enormous stock . . more machinery than at the Coliseum. See address below.

The FALCON MANUFACTURING DIV. of
The FIRST MACHINERY CORP.
209-289 TENTH ST., BKLYN. 15, N. Y. ST. 8-4672

Check 1548 opposite last page.

PRODUCT GUIDE

Name of Exhibitor	*Booth No.*
Jamesbury Corp.	983-985
Automatic Switch Co.	984-986
Jerguson Gage & Valve Co.	989
Cameron Iron Works, Inc. Pressure Control Equipment Div.	997
Hydromatics, Inc.	1032-34
The J. L. Putnam Co., Inc.	1040-42
Mooney Brothers Corp., Chem Flow Corp., Subsidiary	1045
Lock Joint Pipe Co. Oscar Davis Co., Inc.	1078

Drop in and see us

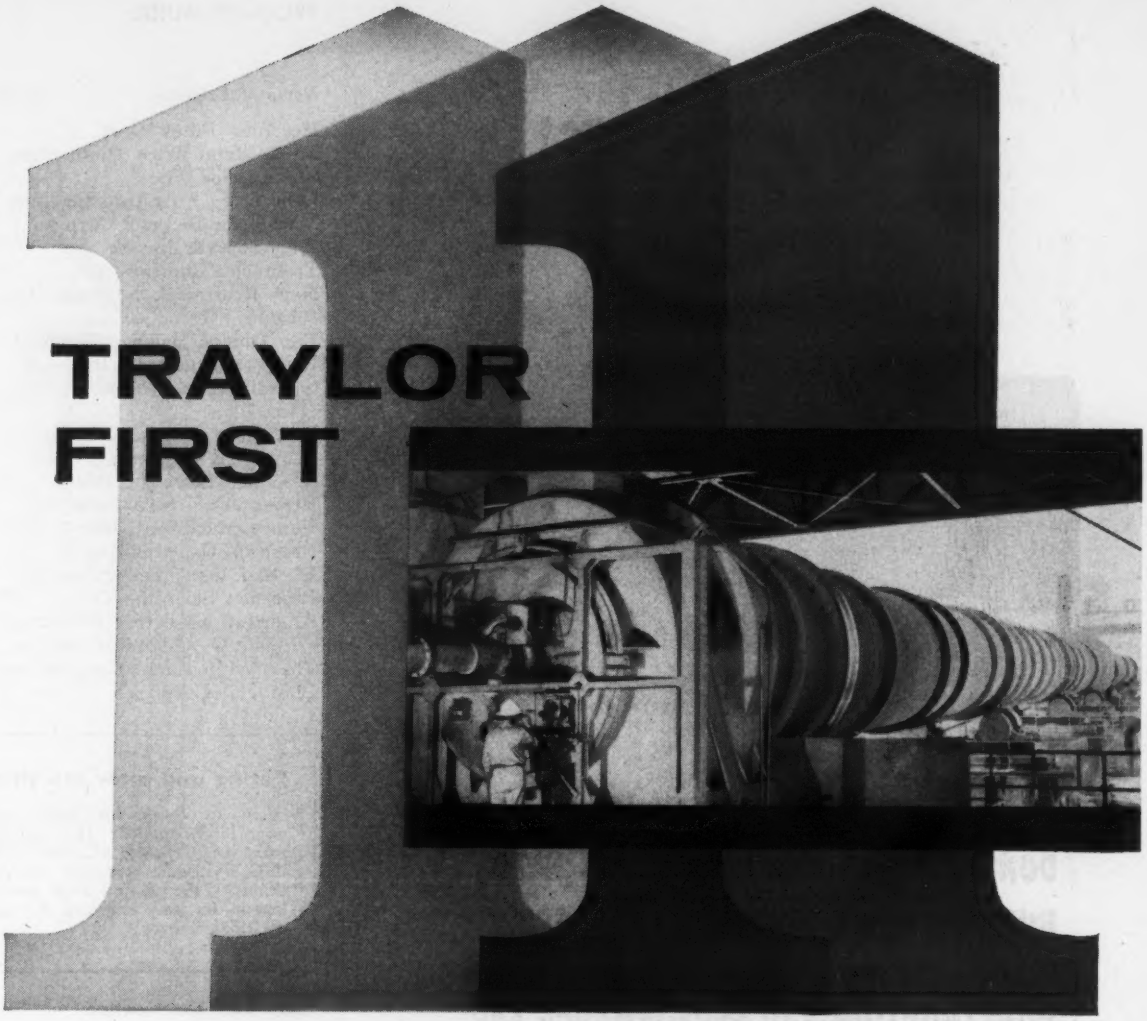
Have a suggestion? Or a complaint? Let's talk about it. We'll be in booth 880, on the third floor.

Ronningen-Petter Co.	1113
White Sewing Machine Corp. Strong Div.	1121
The Bastian-Blessing Company Rego Division	1122
Stockham Valves & Fittings	1123-25
The Johnson Corp.	1128-30
McCartney Manufacturing Company, Inc.	1129
Crucible Steel Co. of America Titanium Division	1151-53-55-57
Ever-Tite Coupling Co., Inc.	1159
Worcester Valve Co., Inc.	1164-66
Hydril Company	1188
Sellers Injector Corporation	1202
Thermon Manufacturing Co., Inc.	1207-09
Keystone Valve Corp.	1236-68
Mission Manufacturing Co.	1258-60
Pacific Valves, Inc.	1266
Saran Lined Pipe Co. Michigan Pipe Co.	1277-79
Sealol, Inc.	1281
Valcor Engineering Corp.	1283
Robertshaw-Fulton Controls Co. Fulton Sylphon Div.	1293
Velan Engineering Companies	1300
A.P.V. Company, Inc.	1303
Hills-McCanna Co.	1307-09
Leslie Co.	1333
The Okadee Company	1342
The Lunkenheimer Co.	1380-82
Waukesha Foundry Co.	1387-89
RKL Controls, Inc.	1388-90
Orbit Valve Company	1415-32
George W. Dahl Co., Inc.	1427
Clayton Mark & Company Forged Steel Products Div.	1435

LABORATORY

Laboratory Instruments

Newark Wire Cloth Company	183
Engelhard Hanovia, Inc. Hanovia Lamp Div.	192-196-225
Instrumentation Associates, Inc.	203
The Welch Scientific Co.	205



Why this 1933 first welded kiln could be the key to your company's profits in the 60's

For the simple well-proved reason that they're better, kilns of all-welded construction are pretty much "standard" today. Important to keep in mind: the standard was set by Traylor . . . builder of the first welded kiln in 1933.

A radical innovation a generation ago —but why so important now? First and obviously, it means that Traylor has the longest record of experience in this special kind of equipment.

More important still: It's merely one example of Traylor's coming up first with new ideas to meet changing needs. Benefits of other Traylor "firsts"—some dating before 1933, many since—are being reaped today throughout the industry, quite likely already including your own plant. Traylor built, for example, the first 60-inch primary gyratory crusher and the first large ball mill.

Today Traylor's proved capacity to pioneer sound innovations in kilns, mills and crushers is enhanced by expanded research capabilities and process know-how.

Up-to-date facilities and a long, impressive record of past "firsts" are a good combination of reasons to call on Traylor first when you're planning for efficient operation in the changing business climate of the sixties.

Visit Booth 446 at
Chemical Industries Exposition

See Chemical Engineering Catalog for details and specifications.

Traylor

TRAYLOR ENGINEERING & MANUFACTURING

DIVISION OF FULLER COMPANY

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4492
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Check 1549 opposite last page.

YOU CAN USE THIS!

BECAUSE PRICE IS IMPORTANT.
DON'T PAY FOR MORE THAN YOU NEED,
BUT DON'T PAY MORE AND GET LESS.
THE B&J TYPE GW STEAM TRAP GIVES YOU CONSTRUCTION AND PERFORMANCE FAR IN EXCESS OF ANY TRAP PRICED SO LOW.

- Discharges more condensate faster.
- Discharges more air faster.
- Operates with absolute uniformity.
- Priced with the lowest yet all working parts are monel and stainless steel.
- Only trap with factory assembled, calibrated and pre-tested replacement interior.
- There is a B&J thermostatic steam trap for almost every trapping job: pressures from vacuum to 300 PSIG, capacities to 25,000 lbs. per hour. Pipe sizes ½" to 2". Bronze, semi-steel, cast steel.

Don't take our word for it. Try a B & J steam trap for 30 days at our expense. Just tell us your capacity and pressure needs.

BARNES & JONES, INC.
34 Crafts St. • Newtonville 60, Massachusetts

"See our exhibit at the Chem Show"

PRODUCT GUIDE

Name of Exhibitor	*Booth No.*
Hercules Filter Corp.	213
Multi-Metal Wire Cloth Company, Inc.	214
Laboratory Furniture Co., Inc.	310
Macalaster Bicknell Corp.	314
Ivan Sorvall, Inc.	316
Technicon Controls, Inc.	320
New Brunswick Scientific Co., Inc.	324
The Torsion Balance Company	328
Lauda Instruments, Inc.	329
Scientific Glass Apparatus Co., Inc.	332
Brabender Instruments, Inc.	340
Schueler & Company Schuco Scientific Div.	345
Brinkmann Instruments, Inc.	360
Namco Machinery Inc.	365
Research Controls, Inc.	366
Buchler Instruments, Inc.	369
Precision Scientific Co.	370-372
American Sterilizer Company Scientific and Industrial Div.	385
The Perkin-Elmer Corporation	386
Photovolt Corp.	389

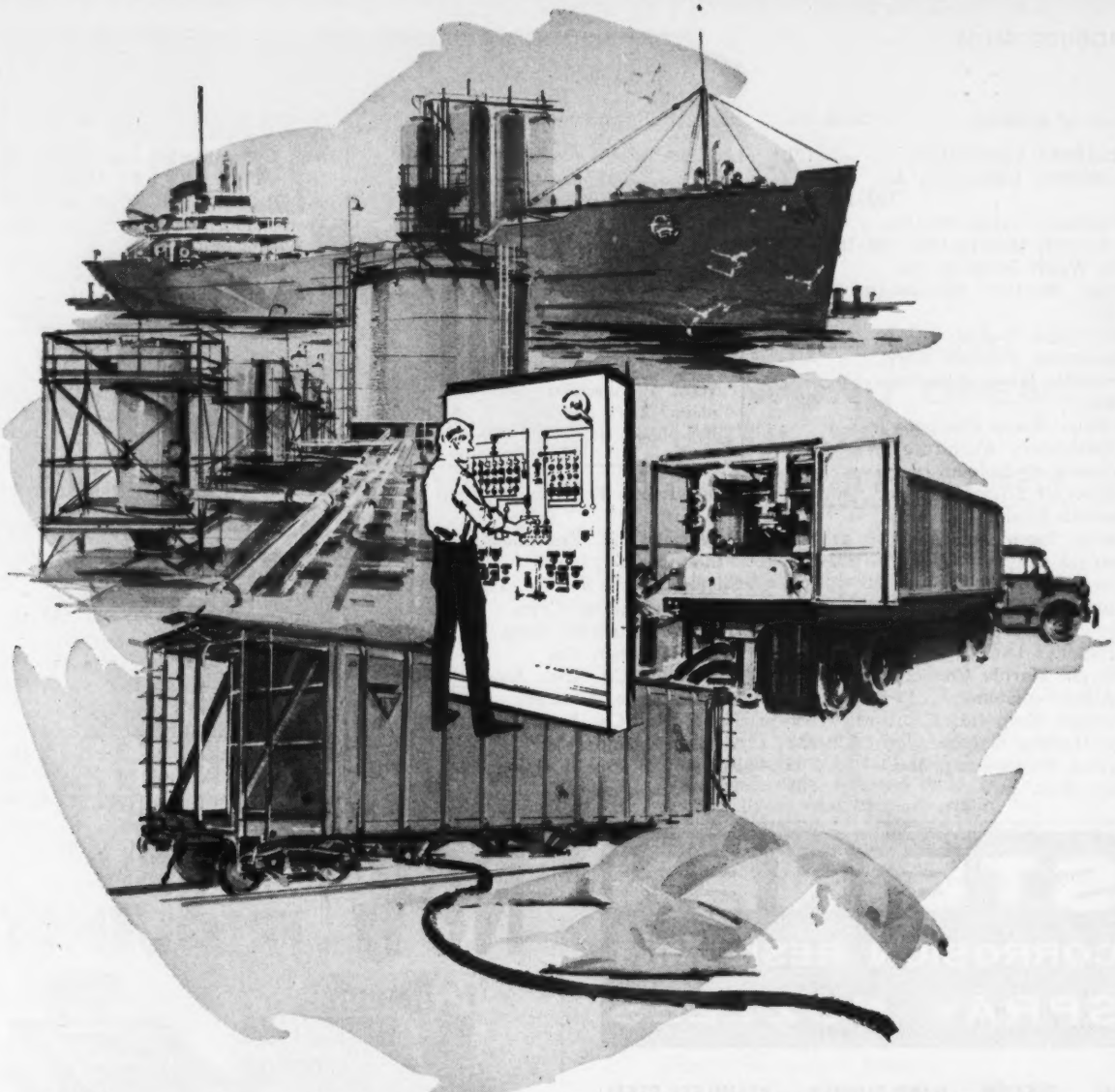
During and after the show

Want to check for things you might have missed? This month's issue of CHEMICAL PROCESSING magazine contains descriptions of the show's high points, tagged for easy spotting. Be sure and look it over.

Brabender Corporation	390
Analytical Measurements, Inc.	395
Barnstead Still and Sterilizer Co.	416
American Instrument Co., Inc.	445
Dresser Industries, Inc. Podbielniak, Inc.	595
The Superior Electric Co.	810
Chemiquip Company	854
Brookfield Engineering Laboratories, Inc.	885-887
McNab, Incorporated	935
Bel-Art Products	937
American-Standard Controls Division	1068
Hudson Industries Corp.	1095
Sigmamotor, Inc.	1099
LKB Instruments, Inc.	1116
Ferranti Electric, Inc.	1144
Hallikainen Instruments	1186
Bench Scale Equipment Co.	1405
Waters Associates	1425
James F. Scanlon	1440

Laboratory Ware & Equipment

Sutton, Steele & Steele, Inc.	37
Corning Glass Works Technical Products Div.	134
Newark Wire Cloth Company	183



Fuller makes things move in the process industries

The flow of profits in the process industries depends increasingly upon the physical flow of dry bulk materials from place to place: from cars, trucks, ships and barges, into storage and out, through a complexity of in-plant operations.

This movement, of itself, adds nothing to product value—yet can cost as much as the materials themselves. Cutting these handling costs—through the application of *air*—is a major Fuller function. Pneumatic conveyors move materials fast. They have a minimum of moving parts. They're closed-in to keep both plant and product cleaner. They lend themselves readily to remote and push-button control. Through its integration of facilities, Fuller engineers, designs, produces and erects pneumatic conveyor systems to handle dry pulverized or granular materials from alum to zinc oxide, fly ash to green coffee beans.

But basically, what Fuller moves is *costs* . . . in the down direction. Fuller is qualified by long experience in the conveying of dry pulverized or granular materials to serve every segment of the process industries, from initial planning of systems to installation. In addition to *four* basic types of pneumatic conveying systems, Fuller also produces heavy process equipment like rotary kilns, mills, crushers as well as fans, blowers, compressors and dust collection equipment. Write today for more details about Fuller services.

Visit Booth 446 at Chemical Industries Exposition

See Chemical Engineering Catalog for details and specifications.

4397
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Fuller

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FULLER DIVISIONS
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Check 1551 opposite last page.

Name of Exhibitor	*Booth No.*
Tri-Homo Corporation	191
Engelhard Industries, Inc.	192-196-225
Engelhard Industries, Inc. Amersil Quartz Div.	192-196-225
The Welch Scientific Co.	205
Great Western Manufacturing Co.	216
Star Tank & Filter Corp.	233
Macalaster Bicknell Corp.	314
Scientific Glass Apparatus Co., Inc.	332
Browne-Morse Company Laboratory Furniture Div.	336
Crescent Petroleum Corp. Metalab Equipment Co.	356
Duralab Equipment Corp.	359
Namco Machinery Inc.	365
Hotpack Corp.	373-375
Kewaunee Mfg. Co.	398
Sturtevant Mill Company	421
The Sharples Corp. Fletcher Div.	459
Georgia Marble Co. Alberene Stone	465
Sharples Corporation	485
The Duriron Co., Inc.	520-532
Bowen Engineering, Inc.	706
Chemplast, Inc.	808
Lead Industries Association	816
American Tool and Machine Co.	862
Continental Manufacturing Co.	876-1093
Bishop & Co. Platinum Works	936-938
Bel-Art Products	937

Drop in and see us

Have a suggestion? Or a complaint? Let's talk about it. We'll be in booth 880, on the third floor.

Pennsylvania Fluorocarbon Co., Inc.	969
Chemical and Pharmaceutical Industry Co., Inc.	991-1064
Charles Ross & Son Co., Inc.	994-996
Louis DeMarkus Corp.	1030
Hudson Industries Corp.	1095
Eaton-Dikeman Co.	1120
The Nalge Co., Inc., American Vulcathene, Division	1201
The Corley Co., Inc.	1204
Cornell Machine Co.	1212-14
Herman H. Sticht Co., Inc.	1280
The Protectoseal Company	1286
Terriss-Consolidated Industries	1313-15-17
Union Process Co.	1329-31
Benson Laboratories, Inc.	1381
The Welsbach Corp. Ozone Processes Div.	1410
The E. T. Oakes Corporation	1424
James F. Scanlon	1440

Reagents

Scientific Glass Apparatus Co., Inc.	332
Union Industrial Equipment Corp.	1076

MATERIAL HANDLING & PACKAGING

Bins

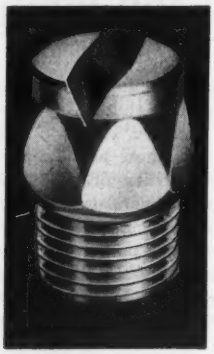
The Day Company	45
Gen'l. American Trans. Corp. Plate and Welding, Div.	436-442
Hoover Ball and Bearing Tote System Div.	856-858-860
The Bucket Elevator Company	1038
Butler Manufacturing Company Industrial Bulk Storage and Transportation	1161
Vibra Screw Feeders Inc.	1296-98

To page 48

STEINEN
CORROSION RESISTANT SPRAY NOZZLES

PVC — TEFLON — HARD RUBBER — STAINLESS STEEL

Maybe your chemical spray problem can be solved with the use of PVC . . . however, it is possible that Hard Rubber, Teflon, or 316 Stainless Steel would do the job as effectively and economically. Research has proven their worth and efficiency in special applications. Steinen Engineers are always at your service to evaluate and recommend the proper **nozzle** and **material** to fit your chemical spray requirements.



FAN-JET
Flat Spray NOZZLE
Capacities .50 to 40 GPM
Spray angles 0, 15, 25, 40, 50, 65, 80, and 90 degrees.

FREE ILLUSTRATED CATALOG — 32 pages of engineering data, nozzle spray characteristics, capacities, applications and simplified nozzle selection tables.

WM. STEINEN MFG. CO.
INDUSTRIAL NOZZLE DIVISION
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NOW! HIGH FREQUENCY

IN A JUNIOR SIZE...AT A JUNIOR PRICE!

AVAILABLE in SLURRY SCREENS • DRY SCREENS with dust enclosures • ELECTRICALLY HEATED SCREENS • WASHING SCREENS • Sizes up to 2 feet wide and 6 feet long. Steel or stainless steel construction.
UNIFORM — high speed centrifugal action produces maximum efficiency, minimum blinding.
EFFECTIVE RANGE — 2 to 325 mesh wet or dry.
RUGGED — totally enclosed vibrating motor, contamination-free . . . no exposed moving parts . . . low power requirements.

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Check 1552 opposite last page.

Check 1553 opposite last page.

BEMI-STRIP* BAGS WON'T OPEN . . . UNTIL YOU GRAB THE TAB!

Manufacturers are now using millions of these rugged multiwall bags with the patented easy-opening TAB. Their products are shipped, stored, and handled in Bemi-Strip bags with complete confidence that they will not open accidentally.

Your customers, too, will appreciate getting bags that are intact, yet open easily and safely without the aid of cutting tools. Material pours cleaner since there are no thread ends to contend with . . . and in many cases, the bags can be reused because they are undamaged in opening.

Look for the TAB. It is your assurance that you are getting the original easy-opening bag with guaranteed locking features.

Call your local Bemis packaging specialist. He can demonstrate these Bemi-Strip benefits right in your own plant. Bemis Bro. Bag Co., 408 Pine Street, Box 92, St. Louis 2, Missouri.

*Trade-Mark

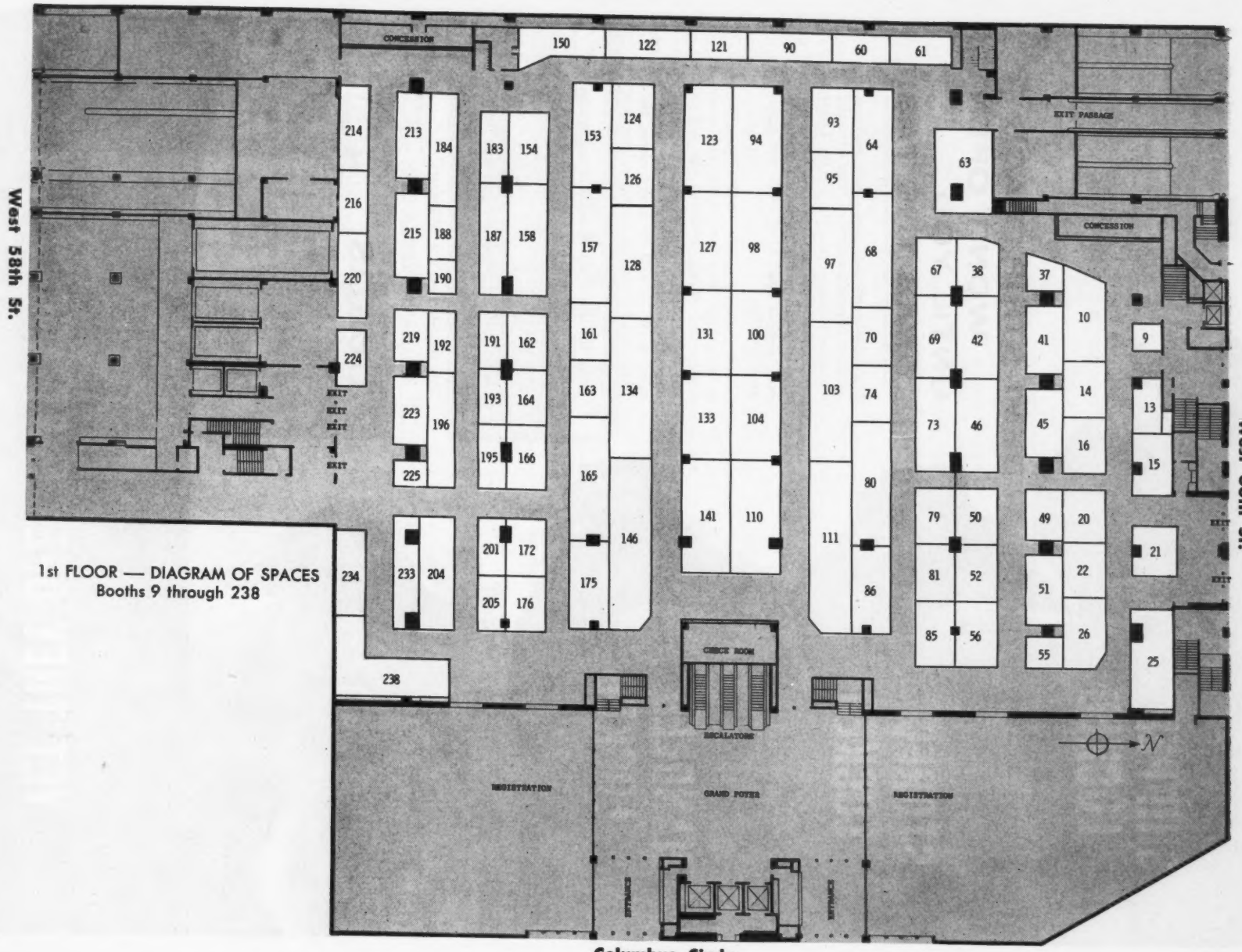
Bemis

where packaging ideas are born

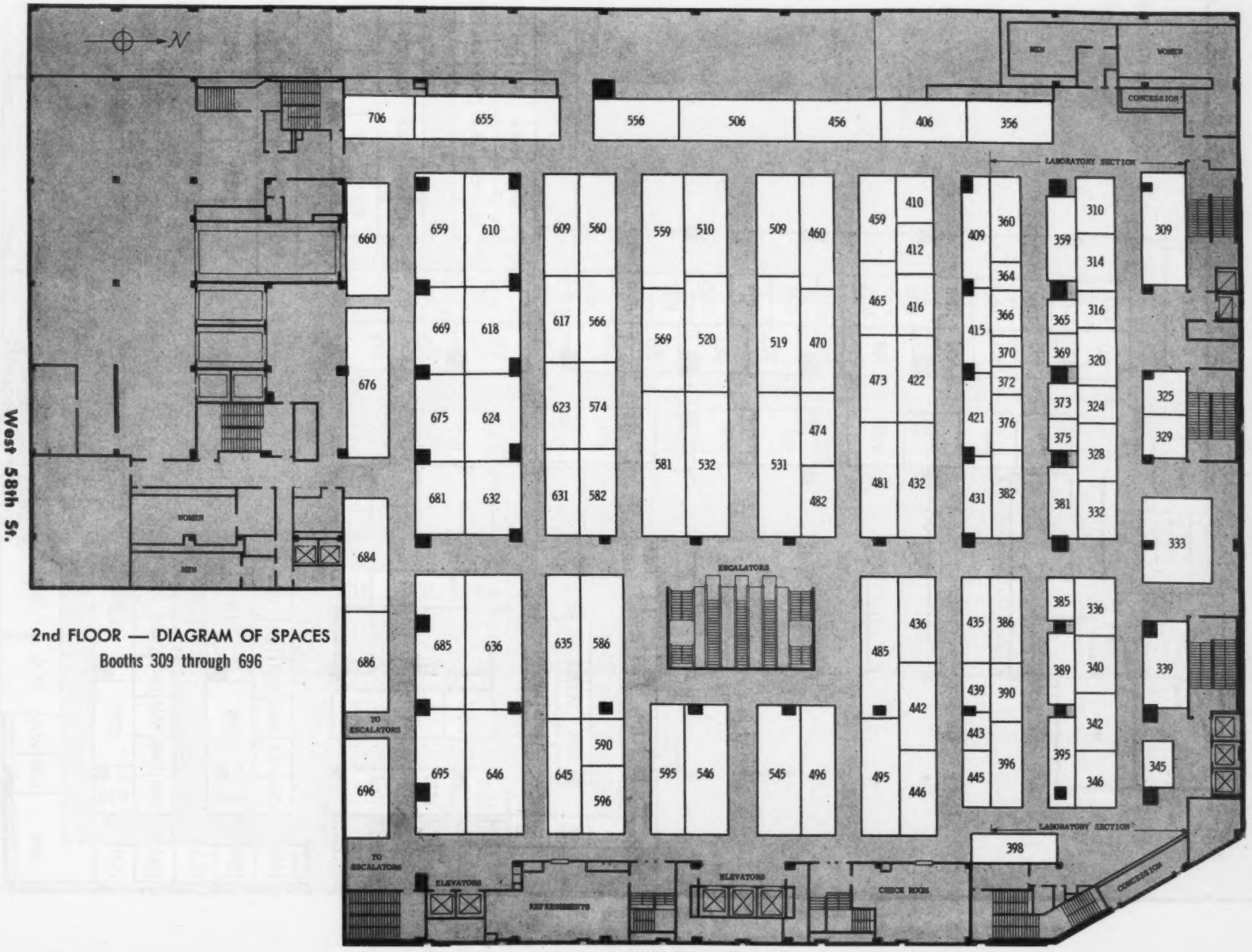
YET THEY OPEN FAST AND CLEAN!

"See our exhibit at the Chem Show"

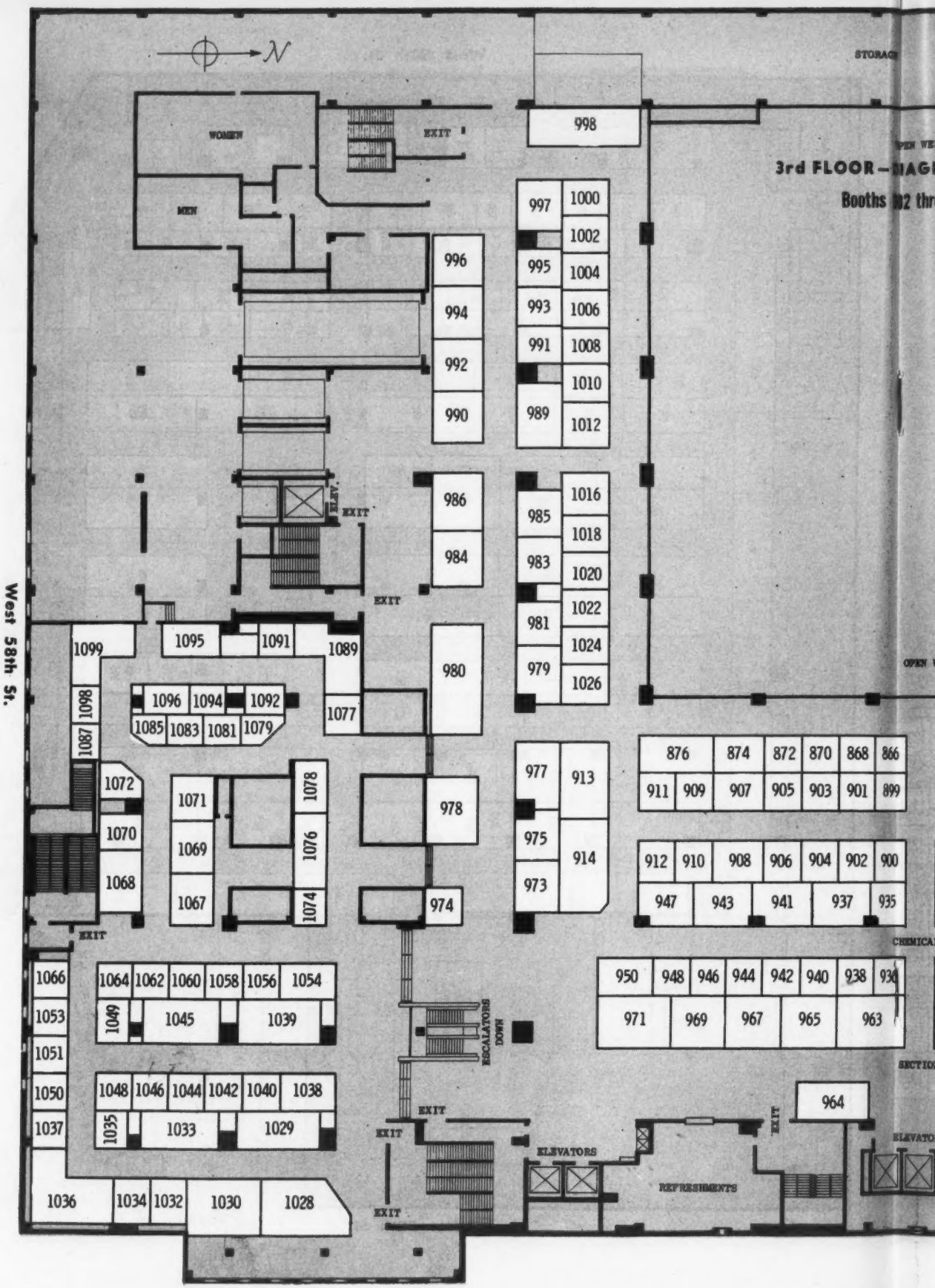
Check 1554 opposite last page.



1st FLOOR — DIAGRAM OF SPACES
Booths 9 through 238



2nd FLOOR — DIAGRAM OF SPACES
Booths 309 through 696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1000
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1008
1010
989
1012
996
994
992
990
ELEV.
EXIT
986
984
985
1016
1018
983
1020
981
1022
1024
979
1026
EXIT
West 58th St.
1099
1095
1091
1089
980
1098
1096
1094
1092
1077
1087
1085
1083
1081
1079
977
913
876
874
872
870
868
866
911
909
907
905
903
901
899
1072
1071
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978
1070
1069
1076
975
914
912
910
908
906
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902
900
1068
1067
1074
973
974
947
943
941
937
935
EXIT
CHEMICA
1066
1064
1062
1060
1058
1056
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950
948
946
944
942
940
938
936
1053
1049
1045
1039
971
969
967
965
963
1051
ESCALATORS DOWN
1050
1048
1046
1044
1042
1040
1038
964
1037
1035
1033
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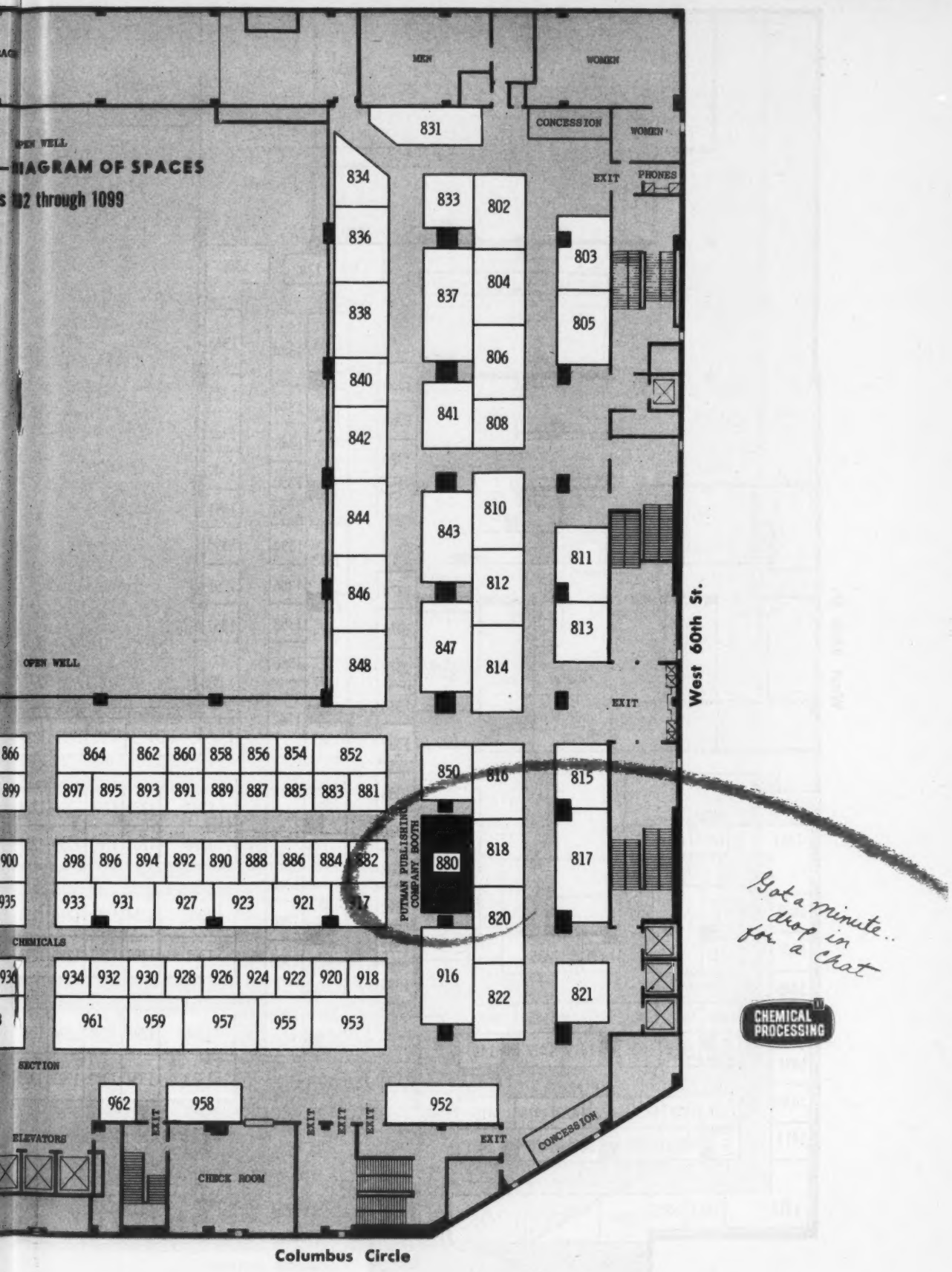
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s 802 through 1099
OPEN WELL
MEN
WOMEN
831
CONCESSION
WOMEN
EXIT
PHONES
834
836
838
840
842
844
846
848
833
802
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EXIT
West 60th St.
OPEN WELL
866
864
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860
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893
891
889
887
885
883
881
850
816
880
818
820
916
822
815
817
821
PUTNAM PUBLISHING COMPANY BOOTH
900
898
896
894
892
890
888
886
884
882
935
933
931
927
923
921
917
CHEMICALS
936
934
932
930
928
926
924
922
920
918
961
959
957
955
953
SECTION
962
958
952
EXIT
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ELEVATORS
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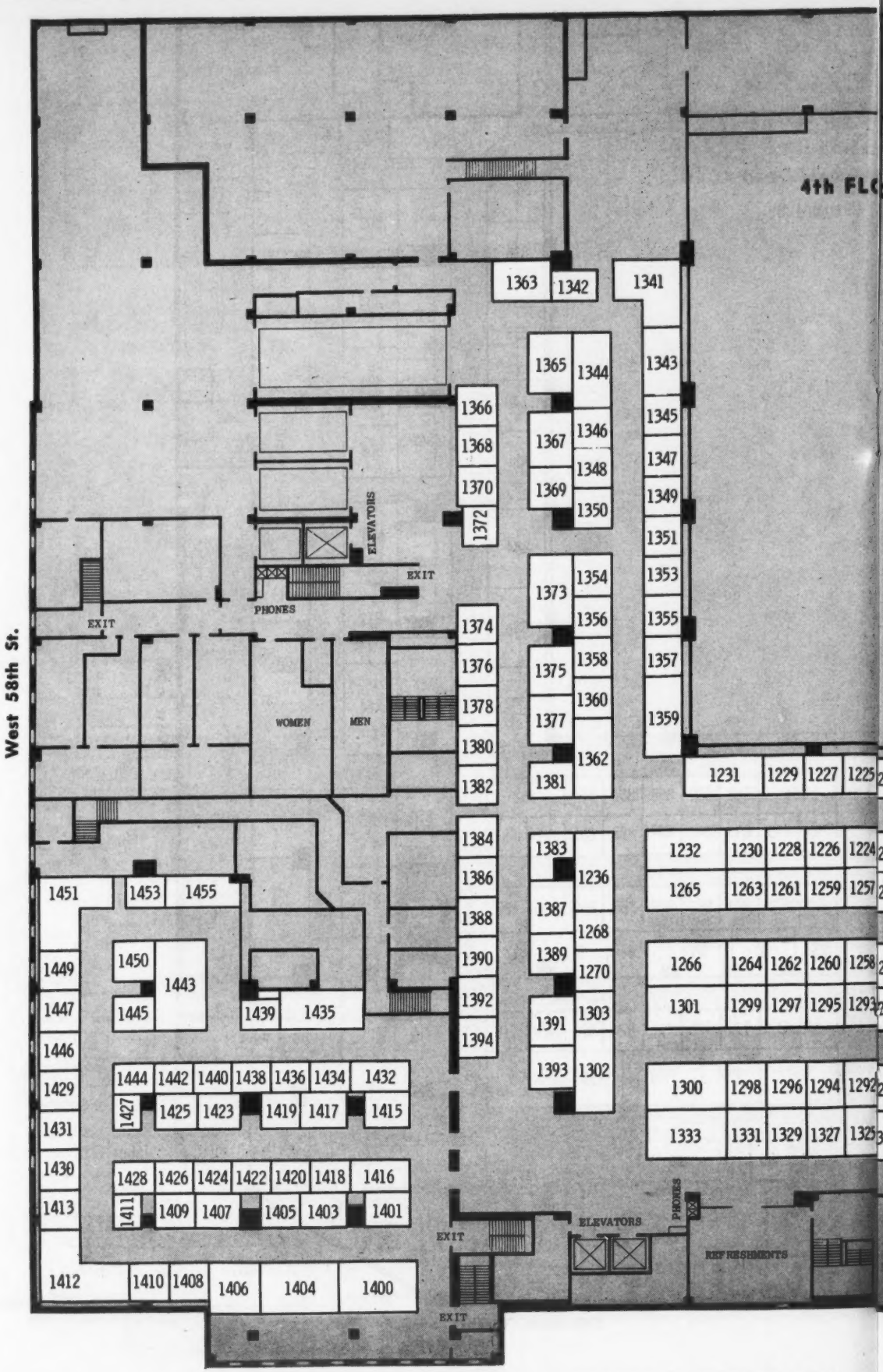
Got a minute.. drop in for a chat
CHEMICAL PROCESSING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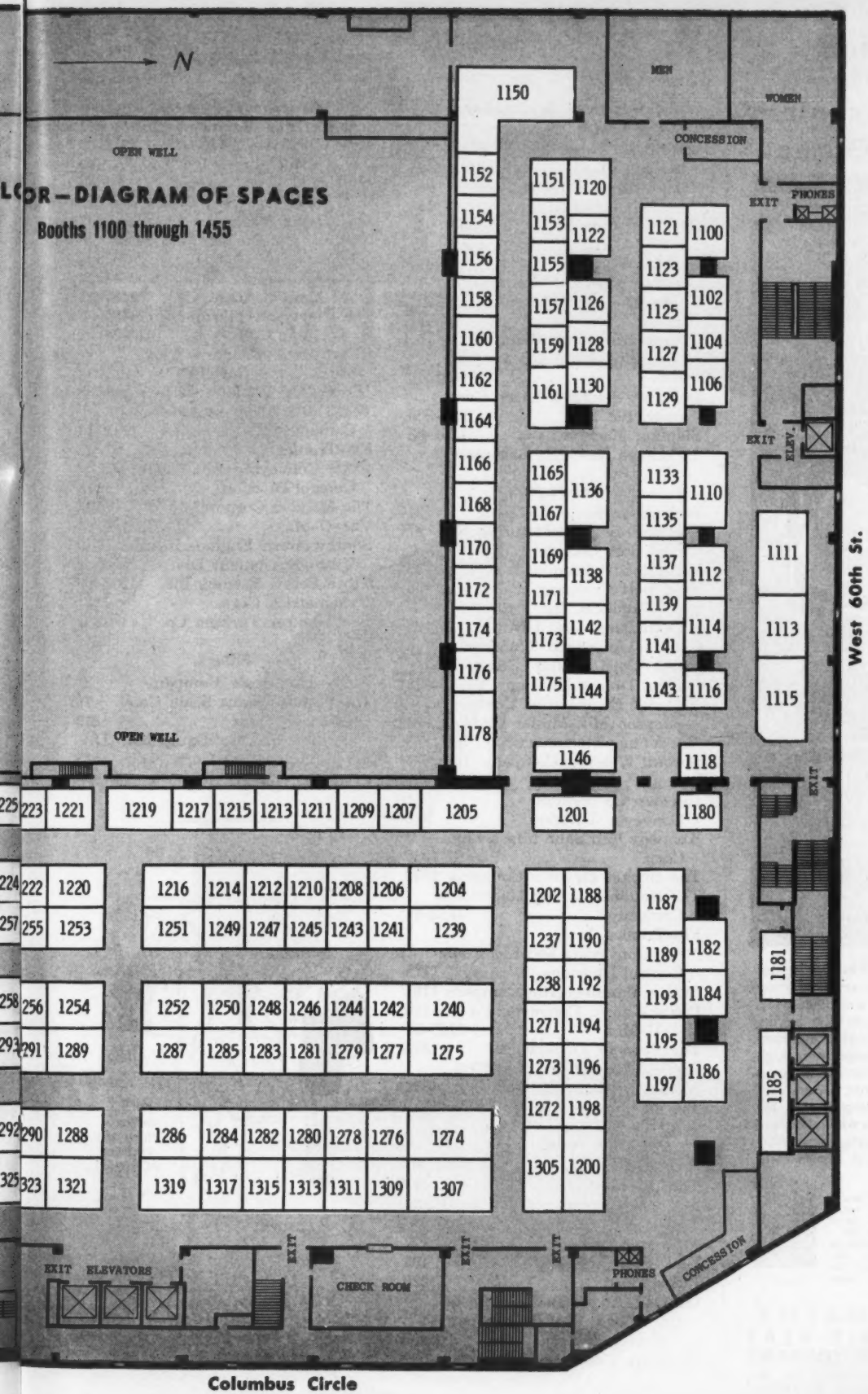
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Booths 1100 through 1455
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WOMEN
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ELEV.
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1162
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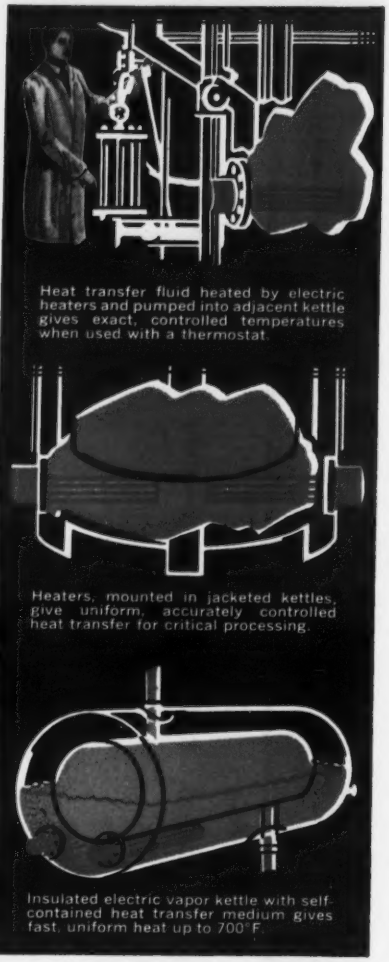
CONCESSION
Columbus Circle

CHROMALOX
Flange-Type, Electric
IMMERSION HEATERS
For hard-to-contain Liquids and Gases



Heat transfer fluid heated by electric heaters and pumped into adjacent kettle gives exact, controlled temperatures when used with a thermostat.

Heaters, mounted in jacketed kettles, give uniform, accurately controlled heat transfer for critical processing.

Insulated electric vapor kettle with self-contained heat transfer medium gives fast, uniform heat up to 700°F.

Chromalox Flange-Type Electric Immersion Heaters are quick, economical solutions to heating compressed air and other gases, for super-heating steam and for heating liquids of all types of heat transfer mediums.

They are ideal for high-temperature/high-pressure applications and for use in corrosive solutions. Chromalox Immersion Heaters provide exact temperatures and maintain these temperatures when used with thermostats. Standard heaters furnished with 150 psi flanges, special flanges withstand up to 4500 psi.

GET THE FACTS. See for yourself how Chromalox Immersion Heaters can help improve efficiency and/or decrease costs. Write for catalog 60.

For more information on Chromalox products consult 1961 Chemical Engineering Catalog, pages 1007-1110

WI-25

CHROMALOX
ELECTRIC HEAT
EDWIN L. WIEGAND COMPANY
7517 Thomas Blvd., Pittsburgh 8, Pa.
VISIT CHROMALOX BOOTH NO. 13
CHEM. SHOW, NOV. 27 — DEC. 1

Check 1555 opposite last page.

PRODUCT GUIDE

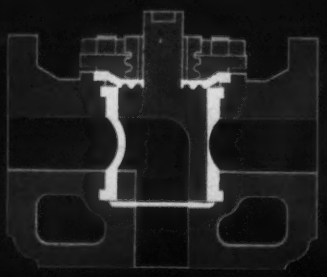
From page 42

Name of Exhibitor	*Booth No.*
Containers & Supports	
The Greif Bros. Cooperage Corporation Research & Engineering Div.	41
Rheem Manufacturing Co. Container Division	153
General American Transportation Corp. Container Division	436-442
General American Transportation Corp. Piggyback, Div.	436-442
General American Transportation Corp. Plate and Welding, Div.	436-442
Delaware Barrel & Drum Company, Inc.	953-955
Stapling Machines Co.	1261-63
Package Research Laboratory	
Conveyors	
Richardson Scale Company	21
The Jeffrey Manufacturing Co.	97
Chain Belt Company Carrier Division	127
Link-Belt Company	165
Dean Products, Inc. Dean Panel Coil Div.	184
General American Transportation Corp. Fuller Company, Subs. Dracco Division	495
National Engineering Company Simpson Mix-Muller Division	695
The Young Machinery Co., Inc.	833
Sprout, Waldron Company, Inc.	846-847-848
Hapman Corporation Conveyor Division	923
Kennedy Van Saun Mfg. & Engr. Corp.	1036
The Bucket Elevator Company	1038
The National Drying Machinery Company	1112-14
Flo-Tronics, Inc. Air Conveying and Electronic Control Divisions	1115
Butler Manufacturing Company	1161
Power-Curve Conveyor Co.	1165
Vac-U-Max	1195-97
The Spencer Turbine Co.	1392
Hoffman Industries, Inc. Air Appliance Division	1394
The Cambridge Wire Cloth Co.	1423
Feeders	
Richardson Scale Co.	21
The Day Company	45
The Exact Weight Scale Co.	79
Chain Belt Company Carrier Division	127
Link-Belt Company	165
Pulva Corp.	220
General American Transportation Corp. Fuller Company Dracco Division	495
Hardinge Company, Inc.	582
American-Marietta Co. Pulverizing Machinery Co.	632
New York Air Brake Co. B-I-F Industries, Inc. Div.	660
Wallace & Tiernan, Inc.	686
C. G. Sargent's Sons Corp.	817
The Young Machinery Co., Inc.	833
Norcross Companies, Kem-Feed Div.	868
Prater Pulverizer Co.	904-906
Eriez Manufacturing Co.	909-911
The Cleveland Vibrator Co.	993-995
B. F. Gump Co.	1022-24-26
Rieke Metal Products Corp. Multi-Meter Corp., Div.	1033
The Bucket Elevator Company	1038
The National Drying Machinery Company	1112-14
Flo-Tronics, Inc. Air Conveying and Electrical Control Divisions	1115
The Madden Corporation	1136
Vac-U-Max	1195-97
Southwestern Engineering Co. Vibro-Equipment Div.	1250-52
Vibra Screw Feeders Inc.	1296-98
Dynametrics Corp.	1311
The Spencer Turbine Co.	1392
Fillers	
Richardson Scale Company	21
The Exact Weight Scale Co.	79
Chemetron Corp. Girdler Process Equipment Div.	219
Ertel Engineering Corp.	623

"Miss Purdy, our demonstration is to be limited to a display of blueprints, diagrams and a mechanical model!"

"See our exhibit at the Chem Show"
Check 1556 opposite last page.

symbol of modern valve design One example: Tufline's 3-way non-lubricated valve [right]....incorporating special tempered pure Teflon® sleeve, tapered plug and sculptured interior body bore....provides both bubble-tight sealing and ease of operation. Unusual bottom-entry design gives wrench-indicated, maximum smooth flow between ports. Available ¼" through 12", 150# and 300# class. For corrosives, light gases to heavy slurries, high vacuum to rated pressures. Choice of metals and actuation. Write Continental Manufacturing Co., 230 Park Ave., NY 17, NY



TUFLiNE valves

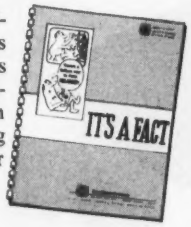
FIRST . . . IN MEASUREMENT AND CONTROL OF MATERIALS FLOW

Is messy carbon feeding giving you a headache? Costly housekeeping and employee health problems cutting your profits?

Whether you're feeding floodable carbon (smoke) or free flowing granular carbon, organic or mineral carbon, B-I-F's totally enclosed feeding systems provide automatic, continuous control of the flow of this hard-to-handle material . . . at high accuracy. Regardless of material characteristics or process conditions, B-I-F has the performance-proved, engineered system for more efficient carbon feeding.

Free Facts

Continuous feeding/blending saves material, reduces costs, controls quality . . . results in bigger processing profits. Write for the Facts today!



B·I·F Industries
A DIVISION OF THE NEW YORK AIR BRAKE COMPANY
387 HARRIS AVENUE, PROVIDENCE 1, RHODE ISLAND

"See our exhibit at the Chem Show"
Check 1557 opposite last page.

PRODUCT GUIDE

Name of Exhibitor — Booth No.

Lapp Insulator Co.
Process Equipment Div. 696
H. L. Stoker Company 1049
Black Products Company 1319

Industrial Trucks

Fruehauf Trailer Company
Special Products Div. 1102

Packaging Materials & Equipment

The Greif Bros. Cooperage Corp.
Research & Engineering Div. 41
The Exact Weight Scale Co. 79
Toledo Scale Corporation
Toledo Scale Div. 157
Bemis Bros. Bag Co. 164-166
General American Transportation Corp. Plastics Div. 436-442
General American Transportation Corp. Tank Storage Terminals Div. 436-442
Aluminum Company of America 474
Pressed Steel Tank Co. 631
Dave Fischbein 872
Eriez Manufacturing Co. 909-911
Chemical and Pharmaceutical Industry Co., Inc. 991-1064
B. F. Gump Co. 1022-24-26
Rieke Metal Products Corp.
Multi-Meter Corp., Div. 1033
Fruehauf Trailer Company
Special Products Div. 1102
Stapling Machines Co. 1261-63
Package Research Laboratory
Black Products Company 1319
Thomas Engineering Co., Inc. 1406
The Burnet Company 1442
Production Equipment Inc. Div.

Transportation Equipment

General American Transportation Corp. Piggyback Div. 436-442
General American Transportation Corp. Tank Car Div. 436-442
Haveg Industries, Inc. 546
Pressed Steel Tank Co. 631
Fruehauf Trailer Company
Special Products Div. 1102
Butler Manufacturing Co. 1161

Vibrators

The Cleveland Vibrator Co. 993-995
Martin Engineering Company 1118
Vibro-Plus Products, Inc. 1393

Weighing & Control Equipment

Richardson Scale Company 21
The Exact Weight Scale Co. 79
The Jeffrey Manufacturing Co. 97
Glengarry Processes, Inc. 121
Chain Belt Company
Carrier Division 127
Toledo Scale Corporation
Toledo Scale Div. 157
Bemis Bros. Bag Co. 164-166

Name of Exhibitor — Booth No.

The Torsion Balance Company 328
New York Air Brake Co.
B-I-F Industries, Inc., Div. 660
Hoover Ball and Bearing
Tote System Div. 856-858-860
Automatic Switch Co. 984-986
B. F. Gump Co. 1022-24-26
H. L. Stoker Company 1049
Sterling-Fleischman, Inc. 1077
Vibra Screw Feeders Inc. 1296-98
Dynametrics Corp. 1311

During and after the show

Want to check for things you might have missed? This month's issue of CHEMICAL PROCESSING magazine contains descriptions of the show's high points, tagged for easy spotting. Be sure and look it over.

Black Products Company 1319
Fairbanks, Morse & Co.
Scale Division 1325-27
The Burnet Company 1442
Production Equipment Inc., Div.

MATERIALS OF CONSTRUCTION

Metals

Chicago Bridge & Iron Company 14
The LaBour Company, Inc. 42
Cooper Alloy Corp.
Vanton Pump Div. 103
Engelhard Industries, Inc.
192-196-225
Lukens Steel Company 201
Ampco Metal, Inc. 412
General American Transportation Corp. Kanigen Div. 436-442
Barco Manufacturing Company
Industrial Aircraft Div. 439
Aluminum Company of America 474
The International Nickel Co., Inc. 509
Fansteel Metallurgical Corporation Chemical & Metallurgical Div. 617
U. S. Steel Corp.
National Tube Div. 669
The H. M. Harper Co. 834
Bishop & Co.
Platinum Works 936-938
Kennametal Inc. 963
Jamesbury Corp. 983-985
Crucible Steel Company of America Titanium Division
1151-53-55-57
The Corley Co., Inc. 1204
Alloy Products Corp. 1205
Armco Steel Corp.
Armco Division 1221-23
Waukesha Foundry Co. 1387-89
Beemer Engineering Company 1416

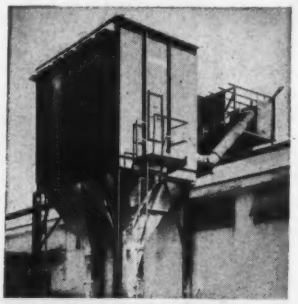
Name of Exhibitor	*Booth No.*
Non-metallic Products	
Engelhard Industries, Inc. Amersil Quartz Div.	192-196-225
Great Lakes Carbon Corporation Electrode Division	204
Great Lakes Carbon Corporation Mining & Mineral Products Div.	204
Union Carbide Corp. National Carbon Company, Div.	460
Haveg Industries, Inc.	546
Keasbey & Mattison Co.	822
Lawrence Pumps, Inc.	852
Jamesbury Corp.	983-985
Lock Joint Pipe Co. Oscar Davis Co., Inc.	1078
Harbison-Walker Refractories Co.	1241-43
John L. Doré Co.	1295-97
Heil Process Equipment Corp.	1305
RKL Controls, Inc.	1388-90
Beemer Engineering Company	1416
PLANT ENGINEERING	
Adhesives	
Dean Products, Inc. Dean Panel Coil Div.	184
Raybestos-Manhattan, Inc.	820
Carl Buck & Associates	1083
The Anchor Packing Co.	1173-75
Radiation Applications Inc.	1438
Air-conditioning Equipment	
Yuba Consolidated Industries, Inc.	882-884-886
Frick Company	1289-91
Armstrong Machine Works	1359
Blowers, Fans & Exhausters	
Ingersoll-Rand Co.	128
Crescent Petroleum Corp. Metalab Equipment Co.	356
General American Transportation Corp. Fuller Company Lehigh Fan & Blower Div.	446
General American Transportation Corp. Fuller Company Sutorbilt Corp.	446

550° F gas filtered by Glastube collector at Perlite mfg. plant

A demonstration of WHEELABRATOR'S

VITAL VALUES

Development of a residential neighborhood near an Eastern perlite manufacturing plant, meant the firm could no longer exhaust fine perlite dust into the air. With temperatures of 550°F involved, only a dust collector utilizing glass fiber tubes would handle the problem. To this challenge Wheelabrator engineers brought the Vital Experience of having used successfully more glass fiber tubes than any other dust control equipment manufacturer. With the installation of a Wheelabrator Glastube Collector, local air pollution control requirements were satisfied. You, too, can depend on Wheelabrator's Vital Values to assure solution of your Dust problems with optimum efficiency and economy.



Fine perlite dust in gas up to 550°F is captured in this Glastube Dust Collector to eliminate an air pollution problem. Write today for detailed data on this hot gas application.

VITAL VALUES FOR INDUSTRY

WHEELABRATOR

DUST AND FUME CONTROL

WHEELABRATOR CORPORATION, 478 S. Byrkit St., Mishawaka, Ind.
In Canada, WHEELABRATOR CORP. of Canada, Ltd. P.O. Box 490, Scarborough, Ont.

"See our exhibit at the Chem Show"

Check 1558 opposite last page.

MORE THAN A MIXER

PREMIER DISPERSATORS

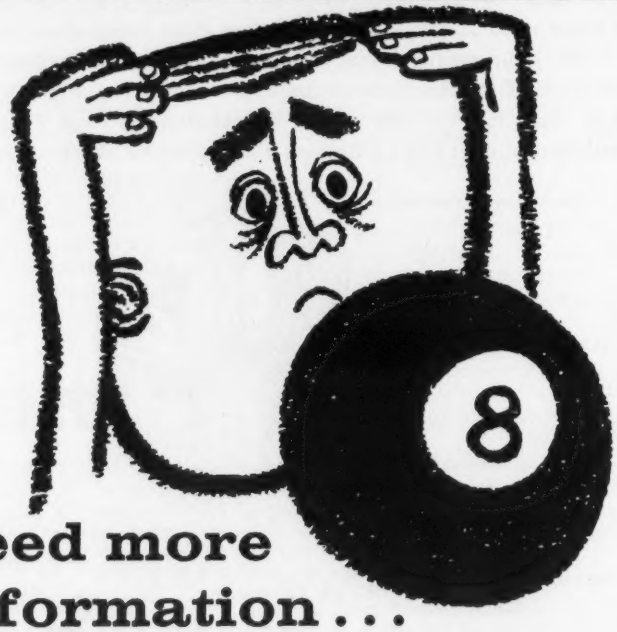
High speed—High shear ... for extremely rapid and thorough dispersion and solution.

The Premier Dispersator is capable of completing in minutes, or even seconds, many operations which take hours or days with conventional mixers. The secret, of course, is in the head. The patented design produces a double shearing action resulting in a complete wetting and breakdown of particle size . . . unobtainable with ordinary mixing devices.

If your mixing or reacting time is excessive, write to:

PREMIER MILL CORP., 224 Fifth Ave., N.Y. 1, N.Y.

Be sure to visit us at the Chem Show — Booth 941.
Check 1559 opposite last page.



need more information . . .

Note there is a key number at the end of advertisements. To request more information, check the proper number on the convenient form opposite the last page of the complete NOVEMBER issue, of which this insert is a part. Send the form to us . . . we do the rest. Information comes direct to you. No obligation, of course.

PRODUCT GUIDE

Name of Exhibitor	*Booth No.*
American Machine and Metals, Inc. De Bothezat Fans Div.	456-506-556
Dresser Industries, Inc. Roots-Connersville Blower	595
Allis-Chalmers Manufacturing Co. Industries Group	636
Niagara Blower Company	655
Du Verre, Inc.	889-891
Aero Supply Manufacturing Co. L. J. Wing Mfg. Co.	1094-96
Flo-Tronics, Inc. Air Conveying and Electronic Control Div.	1115
Heil Process Equipment Corp.	1305
The Spencer Turbine Co.	1392

Drop in and see us

Have a suggestion? Or a complaint? Let's talk about it. We'll be in booth 880, on the third floor.

Hoffman Industries, Inc. Air Appliance Division	1394
Eberly Dynamics, Inc. Protective Plastics Co.	1411
Torit Manufacturing Co.	1446
Sulzer Bros., Inc.	1455

Boilers

Eclipse Lookout Co. Eclipse Boiler Div.	973

Building & Construction Materials

Great Lakes Carbon Corporation Electrode Div.	204
Aluminum Company of America Chemicals Division	470
The International Nickel Co., Inc.	509
U. S. Steel Corp. National Tube Div.	669
Lead Industries Association	816
Raybestos-Manhattan, Inc.	820
The H. M. Harper Co.	834
Union Steel Corporation	840
Texas Instruments Incorporated Metals & Controls, Inc., Div.	841
Kennametal Inc.	963
Kraloy/Chemtrol Co.	1111
Victaulic Co. of America	1190-92
The Philip Carey Mfg. Co.	1211-13
Harbison-Walker Refractories Co.	1241-43

Burners

Peabody Engineering Corp.	821
Thermal Research & Engineering Corp.	1349-51

Cleaning Materials & Equipment

Oakite Products, Inc.	1072
Vac-U-Max	1195-97

Name of Exhibitor	*Booth No.*
Sellers Injector Corporation	1202
The Protectoseal Company	1286
The Spencer Turbine Co.	1392

Clothing & Gloves

Mine Safety Appliances Co.	158
Miller Products Company, Inc.	1092

Coatings

The Greif Bros. Cooperage Corp. Research & Engineering Div.	41
U. S. Stoneware Co. Alite Div.	111
General American Transportation Corp. Kanigen Division	436-442
Lead Industries Association	816
The Galigher Company	843
General Plastics Corp.	967
The Philip Carey Manufacturing Co.	1211-13

Compressors

Norwalk Company, Inc.	20
Ingersoll-Rand Co.	128
Autoclave Engineers Sales Corp.	346
General American Transportation Corp. Fuller Co., Subs.	446
Dresser Industries, Inc. Roots-Connersville Blower Div.	595
McCartney Manufacturing Company, Inc.	1129
Frick Company	1289-91
Fairbanks, Morse & Co. Compressor Div.	1321-23
York Corporation	1358-60
Beckley, Haltom & Hickman Services Corp.	1363

During and after the show

Want to check for things you might have missed? This month's issue of CHEMICAL PROCESSING magazine contains descriptions of the show's high points, tagged for easy spotting. Be sure and look it over.

Hoffman Industries, Inc. Air Appliance Division	1394
Sulzer Bros., Inc.	1455

Electric-power Generation & Transmission Equipment

I-T-E Circuit Breaker Company	64
Great Lakes Carbon Corporation Electrode Div.	204
General Electric Company Apparatus Sales Div.	482
Dresser Industries, Inc. Clark Bros. Co.	595
Kraloy/Chemtrol Co.	1111
Beckley, Haltom & Hickman Services Corp.	1363

Fuels

Norwalk Company, Inc.	20

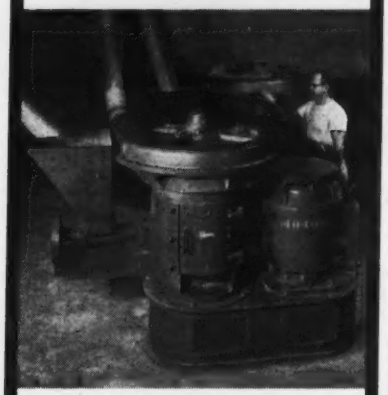
IN CORROSION RESISTANT PROCESSING EQUIPMENT
Style A Kettle Standard Jacketed 5 to 500 gal.
Style CW Kettle Standard Jacketed 80 to 300 gal.
Style CW3T Kettle with Center-Line Scraper Agitator, 80 to 300 gal.
Style B Kettle Full Jacketed, 10 to 300 gal.
The Name for Quality is LEE
Style C Kettle Standard Jacketed, 5 to 100 gal.
Pressure Kettle Standard Jacketed 40 to 200 gal.
Storage Tank 100 to 5,000 gal.
Pulp Tank 500 to 2,000 gal.
Vacuum Pan 10 to 500 gal.
SPECIAL DESIGNS
Interested in modifications of standard units or custom-designed equipment? Our facilities are such that we can make any special designed units you may require. Write us.
Quick Cooling Pan 50 to 200 gal.
WRITE for bulletins on any of the products illustrated.
LEE
METAL PRODUCTS COMPANY, INC.
A.S.M.E. CODE CONSTRUCTION AVAILABLE
Kettles, Plain and Jacketed
Tanks, Processing and Storage
Agitators and Accessories
Vacuum and Pressure Equipment
418 PINE STREET, PHILIPSBURG, PA.

"See our exhibit at the Chem Show"

Check 1560 opposite last page.

Bauer

Hurricane Pulverizer-Classifier



For Sub Sieve Processing

- **Uniform particle reduction to any desired fineness**
- **Precise classification**
- **Accurate quality control**
- **Extra high capacity increases production**

When specifications call for uniform fineness between 150 microns to one micron, you can get accurately controlled size reduction and sharp classification in one pass with the Bauer Hurricane Pulverizer-Classifier.

The efficient Hurricane is precision built for dependable, long term service. It is extremely versatile and can be used to process a wide variety of dry, friable materials. Because it has a higher operating capacity than conventional equipment of this type, the Hurricane assures higher production with no increase in floor space.

This modern pulverizer is available in two sizes—24″ with a 60 HP or 75 HP motor and 30″ with a 100 HP or 125 HP motor. Why not investigate its potentiality for upgrading production in your plant? Ask for literature and other data today.

The Bauer Bros. Co.
Springfield, Ohio

Visit Bauer in Booths No. 1430-31 at the Chemical Show in New York, Nov. 27—Dec. 1 incl.

Check 1561 opposite last page.

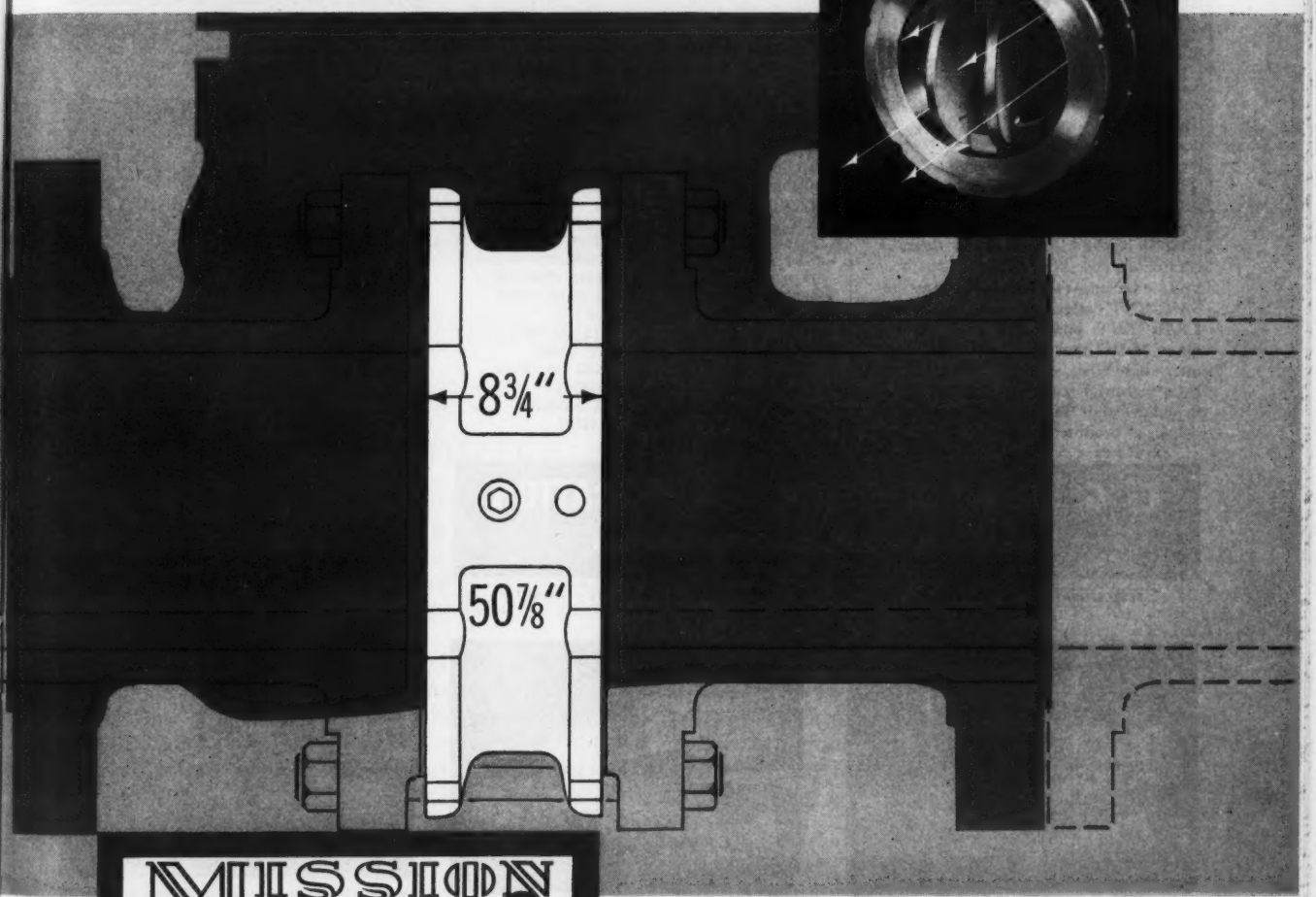
Name of Exhibitor	*Booth No.*
Heating & Dehumidification Equipment (Personnel)	
Monarch Mfg. Works, Inc.	881
Aero Supply Manufacturing Co.	
L. J. Wing Manufacturing Co.	1094-96
Barnes & Jones Inc.	1439
Insulation	
Johns- Manville	415-645
Chemplast, Inc.	808
Pall Corporation	812
Keasbey & Mattison Co.	822
The Eagle-Picher Co. Insulation Div.	1167-69
The Philip Carey Manufacturing Co.	1211-13
Pittsburgh Corning Corp.	1239
Lighting Equipment	
General Electric Company Apparatus Sales Div.	482
Automatic Switch Co.	984-986
Jerguson Gage & Valve Co.	989
Lubricants & Lubrication Equipment	
Eaton Manufacturing Co. Farval Division	74
Chemplast, Inc.	808
Crawford Fitting Company	844
Bowser, Inc. Process Filters Div.	1166-68-70
Motors & Drives	
Norwalk Company, Inc.	20
Eaton Manufacturing Co. Cleveland Worm and Gear Div.	74
Philadelphia Gear Corp.	123
Link-Belt Company	165
General Electric Company Apparatus Sales Div.	482
The Superior Electric Co.	810
Morehouse-Cowles Inc.	814
Graham Transmissions, Inc.	1053-66
Goulds Pumps, Inc.	1288-90-92-94
ACF Industries, Inc. ACF Electronics Div.	1353
Beckley, Haltom & Hickman Services Corp.	1363
Storage Tanks	
Chicago Bridge & Iron Compay	14
The Day Company	45
Lead Lined Iron Pipe Co.	70
General American Transportation Corp. Plastics Div.	436-442
General American Transportation Corp. Plate and Welding Div.	436-442
General American Transportation Corp. Tank Storage Terminals Div.	436-442
The International Nickel Co., Inc.	509
Pressed Steel Tank Co.	631
U. S. Steel Corp. National Tube Div.	669
Black, Sivalls & Bryson, Inc.	685
Delaware Barrel & Drum Company, Inc.	953-955
Stainless Products Corp.	1158
Butler Manufacturing Company	1161
The Nalge Co., Inc., American Vulcathene, Division	1201
Alloy Products Corp.	1205
The Protectoseal Company	1286
Lee Metal Products Co., Inc.	1384
Eberly Dynamics, Inc. Protective Plastic Co.	1411
Tools	
Ingersoll-Rand Co.	128
Parker-Hannifin Corp. Parker Fittings & Hose Div.	431
Durametallic Corp.	1216
Biach Industries, Inc.	1253
Thomas Engineering Co., Inc.	1406
Water-treatment Materials & Equipment	
Barnebey-Cheney	52
Sparkler Manufacturing Co.	56
Pfaudler Permutit Inc.	110-141
American Meter Company, Inc. Pump Div.	150
Engelhard Hanovia, Inc. Hanovia Lamp Div.	192-196-225
Hercules Filter Corp.	213
American Sterilizer Company Scientific and Industrial Div.	385
Barnstead Still and Sterilizer Co.	416
General American Transportation Corp. Infilco Inc.	435
Hardinge Company, Inc.	582
Milton Roy Co., Serfass Corporation	675
Norcross Companies, Kem-Feed Div.	868

". . . mind moving your buckets from under my pipe?

The illustration compares a 10-inch Duo-Chek Check Valve with a conventional check valve. In one application a 10-inch, Series 2500, Duo-Chek, which meets all ASA strength and design requirements except face-to-face size, is in continuous operation on a reciprocating compressor discharge line. A conventional swing check in this service would weigh over 5,000 pounds. The Duo-Chek weighs 285 pounds.

Here are some more quick facts: Available in sizes from 2 to 48 inches, ASA series 125 through 2500, in steel, stainless, aluminum, and bronze. Corrosion and heat resistant seals available. To find out more about these NO-Slam, easy-to-install, easy-to-maintain valves, write Mission today. Your competitors are already saving with them.

Mission Duo-Chek weighs less than 10% as much



MISSION VALVE AND PUMP CO.

See our exhibit in Booths Number 1256-58-60 at the 28th Exposition of Chemical Industries-New York, November 27-December 1

MISSION VALVE AND PUMP CO. A SUBSIDIARY OF MISSION MANUFACTURING CO. P. O. Box 4209, Houston, Texas • Cable Address 'MISSCO' Export Office: 30 Rockefeller Plaza, New York • In the United Kingdom: MISSION MANUFACTURING CO., LTD., 1 Hanover Square, London W. 1 England • Cable Address 'MISSOMAN' • Sold by Mission Manufacturing Company outside of Canada and the U.S.A.

FOR THE CHEMICAL PROCESS INDUSTRIES

SARGENT

at the Chem Show BOOTH 817

DRYERS — Conveyor, Tray, Truck, Rotary Drum, Pole, Tunnel

EXTRUDERS — Preforms material into rods or other shapes

GRANULATORS — Roller Bar type, or with Paddles

COOLERS — Integral part of dryer housing; also separately

FEEDERS — Vibratory, or Oscillating, or Standard

THROUGH MANY YEARS of unending research in our laboratory and in the field, SARGENT leadership has become firmly established in the designing and building of superior drying equipment to meet changing and special requirements. ¶ Whether the product needs short or long exposure drying, whether production is measured in ounces or in tons, whether it is batch or continuous process drying, and whatever your exacting requirements may be, SARGENT design will meet them fully. ¶ SARGENT engineering has created many "firsts" that are standard today in many industries. ¶ SARGENT machines carry a firm performance guarantee. Our machines and our people consistently deliver as promised — and more.

TYPICAL OF MANY PRODUCTS PROCESSED BY SARGENT

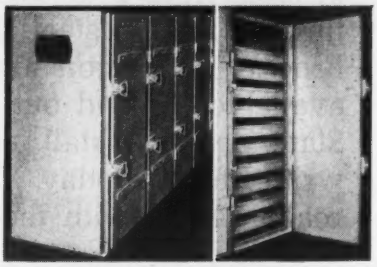
ABRASIVES	POLYURETHANE SPONGE
CALCIUM CARBONATE	PROTEINS
CARBON BLACK	RUBBER (All Types)
CEREALS	SEEDS
CHEMICALS	SENSITIVE AND UNSTABLE MATERIALS
CLAYS	SODA LIME
DAIRY PRODUCTS	SOY BEAN PRODUCTS
EXPLOSIVES	SMALL METAL PARTS
FEEDSTUFFS	STARCH
FRUITS, BERRIES	TEXTILE (All) FIBRES, TOPS, YARNS
GRAINS	TOBACCO (All Types)
NUTS and OILS	VEGETABLES
PAPER	WASTE SLUDGES
PIGMENTS	ZINC OXIDE
PHARMACEUTICALS	
PLASTICS	

C. G. SARGENT'S SONS CORPORATION

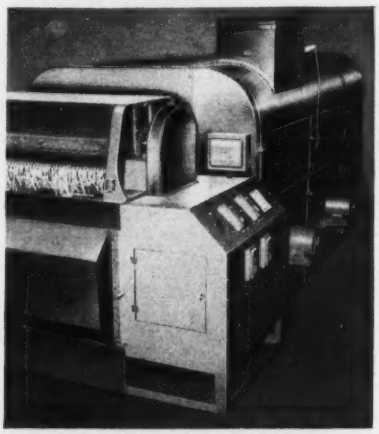
Graniteville, SINCE 1852 Massachusetts

REPRESENTATIVES IN: NEW YORK • PHILADELPHIA • CINCINNATI • CHARLOTTE • ATLANTA
LOS ANGELES • HOUSTON • CHICAGO • DETROIT • TORONTO

TRUCK DRYER — Two compartment truck dryer installation in large chemical company. Controlled even heat distribution through all trucks. Economical, fast batch drying of many materials.

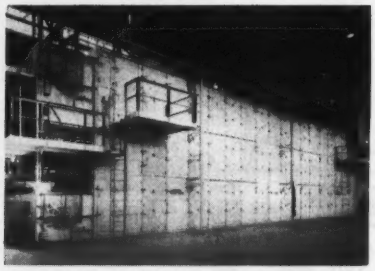


TRAY DRYERS — For safest, efficient drying of wet-powdered, heat-sensitive or unstable materials. Designed in any size, any number of trays. Heat flows evenly over each tray; no recirculation of air prevents contamination.



PILOT PLANT DRYER with Extruder and Cooler — Stainless steel throughout. Four foot single hopper extruder lined with stainless steel, cam type chrome plated paddles. Entire unit shipped pre-assembled.

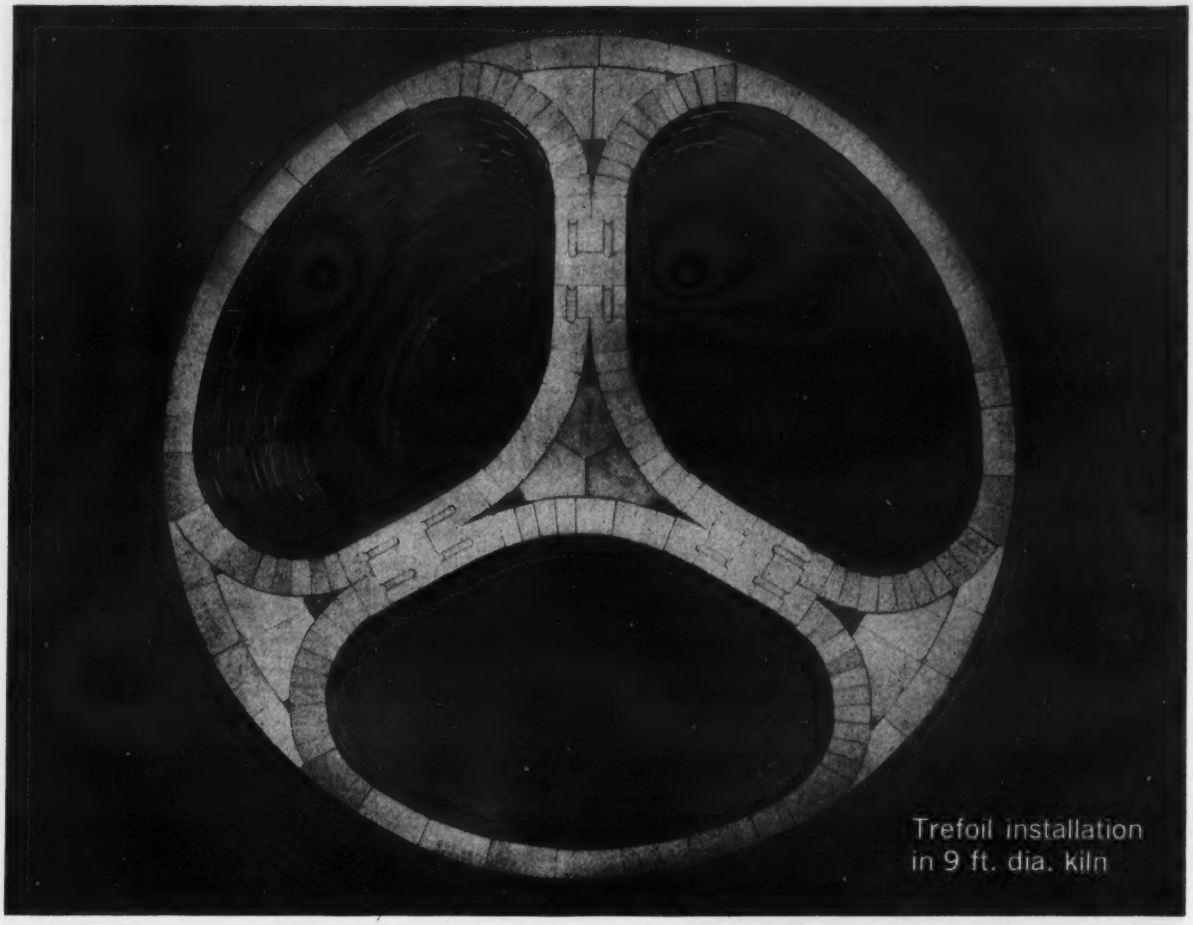
PIGMENT DRYER with Granulator — Single pass, four drying sections, one cooling section. Eight foot single hopper granulator. Entering moisture content of the material, 45% wet basis, leaves the dryer at .05% wet basis.



SYNTHETIC RUBBER — Three-pass dryer. Direct gas-fired. All safety controls. Only two burners, which bring working temperature within ten minutes of start-up. This large dryer installed and working within four weeks.

KAOLIN — Single pass, two stage dryer with extruder to pre-form wet clay into rods. 20 drying sections, 2 cooling sections. Gas and oil combination burners, four zones, each with own heating system. Double hopper extruder for largest storage capacity.

Check 1563 opposite last page.



Refractory Heat Exchangers increase rotary kiln efficiency

Harbison-Walker TREFOIL design provides important benefits

This construction built with refractories especially suited for the purpose is showing exceedingly gratifying economies in rotary limestone and lime sludge kilns. Its use is the means of imparting sensible heat to the charge, even to the degree of partial calcination in some installations.

The structural strength of the trefoil construction is proving its excellent durability. An original installation in a 10′ diameter kiln has now been in service for three years, with indications of considerably longer life. This good service presently is approaching repetition in a number of other kilns.

The magnitude of preheating of the charge in passing through the trefoil tends to moderate the temperature in the hottest zone, necessary for a given rate of production. The development of excessive accretions in the high temperature zones with certain fuels may be reduced and the lining life extended.

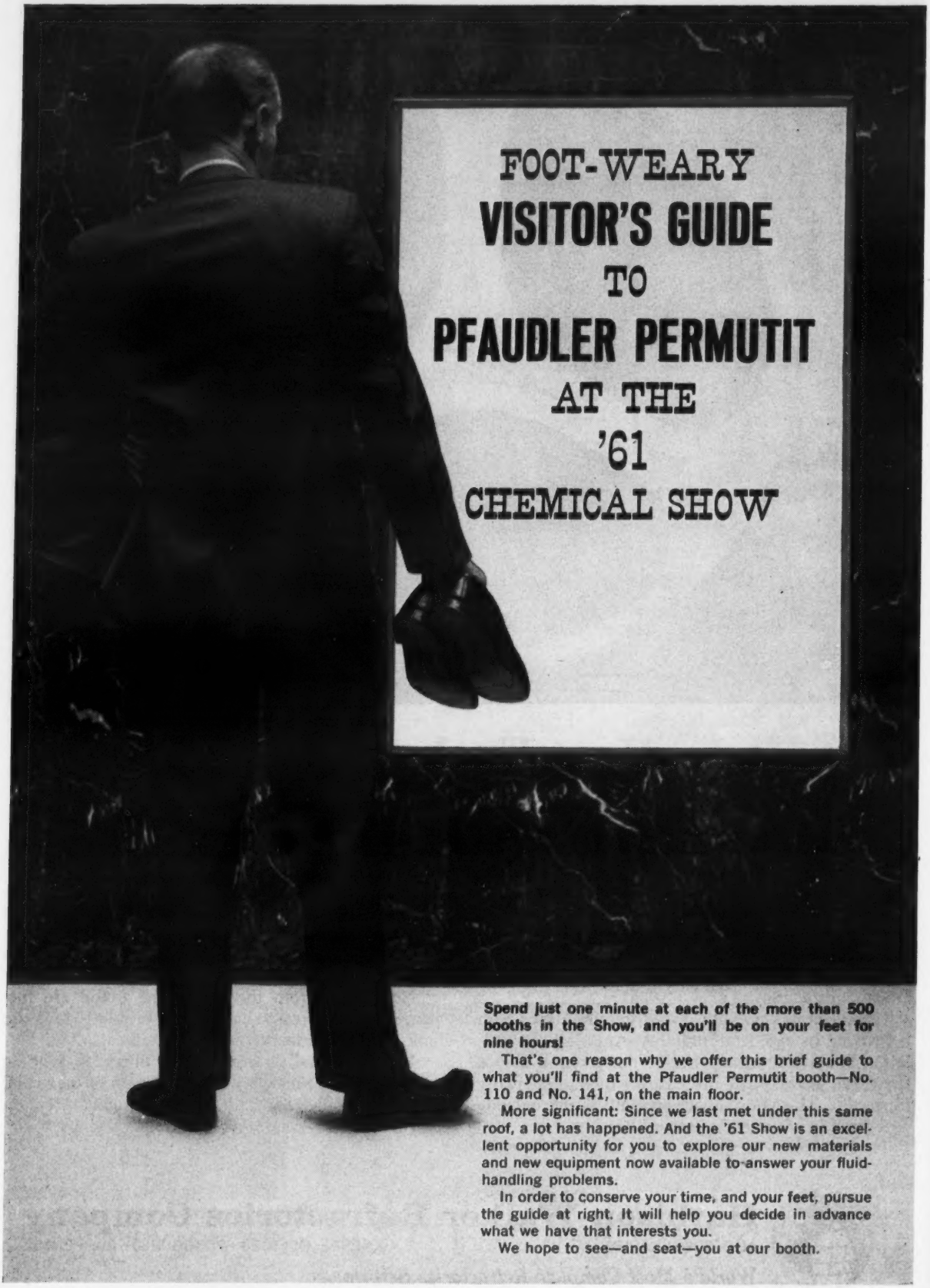
Net results from the use of the trefoil are fuel savings and increased production in kilns which are not greatly overloaded beyond rated capacities.

H-W technical service is freely offered in helping determine various details such as length of the trefoil section (usually 15 to 25 ft.) and longitudinal location for the various conditions involved.

Harbison-Walker Refractories Company
AND SUBSIDIARIES — GENERAL OFFICES: PITTSBURGH 22, PENNA.
World's Most Complete Refractories Service
HW 60-3

"See our exhibit at the Chem Show"

Check 1564 opposite last page.



Spend just one minute at each of the more than 500 booths in the Show, and you'll be on your feet for nine hours!

That's one reason why we offer this brief guide to what you'll find at the Pfaudler Permutit booth—No. 110 and No. 141, on the main floor.

More significant: Since we last met under this same roof, a lot has happened. And the '61 Show is an excellent opportunity for you to explore our new materials and new equipment now available to answer your fluid-handling problems.

In order to conserve your time, and your feet, pursue the guide at right. It will help you decide in advance what we have that interests you.

We hope to see—and seat—you at our booth.

NEW MATERIALS TO FIGHT CORROSION

MORE EFFICIENT UNIT OPERATIONS

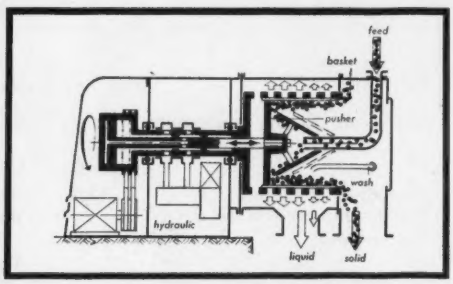
AND OTHER FLUID HANDLING EQUIPMENT

Never before has Pfaudler, or any company, offered such a complete range of corrosion-resistant materials. Start with **Nucerite***. This newly developed family of ceramic-metal composites now makes possible and practical the handling of corrosives at 500°-1500° F. At the show you'll see: (a) 200-gallon Nucerite reactor, (b) Nucerite manhole extension collar, (c) Nucerite immersion heater for acid recovery. Don't forget to ask about our field-test sample program. Of course, you'll want to discuss **Pfaudler Glasteel** TM for all your acid-alkali processing to 350° and higher. You'll see a 500-gallon stock-standard Glasteel reactor in operation.

Next examine the **titanium, tantalum** and **zirconium** process equipment. Be sure to question us on the economics of titanium in chlorine gas cooling. Don't miss the 300-gallon **Pfaudlon® 301** plastic-lined vessel, featuring broad-range corrosion protection to 210°.

Nucerite, Pfaudler's new family of ceramic-metal composites for high-temperature corrosion protection, now offered on vessels to 2000-gallon capacity. Illustrated: Nucerite acid-recovery immersion heater.

New to the chemical industry are the **Krupp filtering centrifuges,** distributed solely by Pfaudler. Two types are offered—continuous Pusher and automatic-batch Peeler with horizontal basket. See the Pusher unit on display. Discuss time and cost savings afforded in dewatering free-draining crystals, salts, starches, and polyolefins. Examine the life-size, full-dimension cutaway model of the **Pfaudler Wiped Film Evaporator,** animated to show product flow. See for yourself how efficiently heat-sensitive and viscous materials are handled in this true wiped-surface evaporator. Next, evaluate firsthand Pfaudler's compact **TW Drive.** A wise choice for your plant-standard drive. Fixed-speed gear, fixed- and variable-speed belt models on display—showing hookups to open and closed vessels. Demonstrate for yourself the flexibility of the variable-speed TW in operation on the Glasteel reactor. Sign up for our new 6-step Agitation HP Calculator.



Krupp Pusher-type centrifuge to be shown for the first time in the U. S. Short-stroke Pusher acting over rotating screen deliquors, washes and discharges crystals continuously with minimum product degradation.

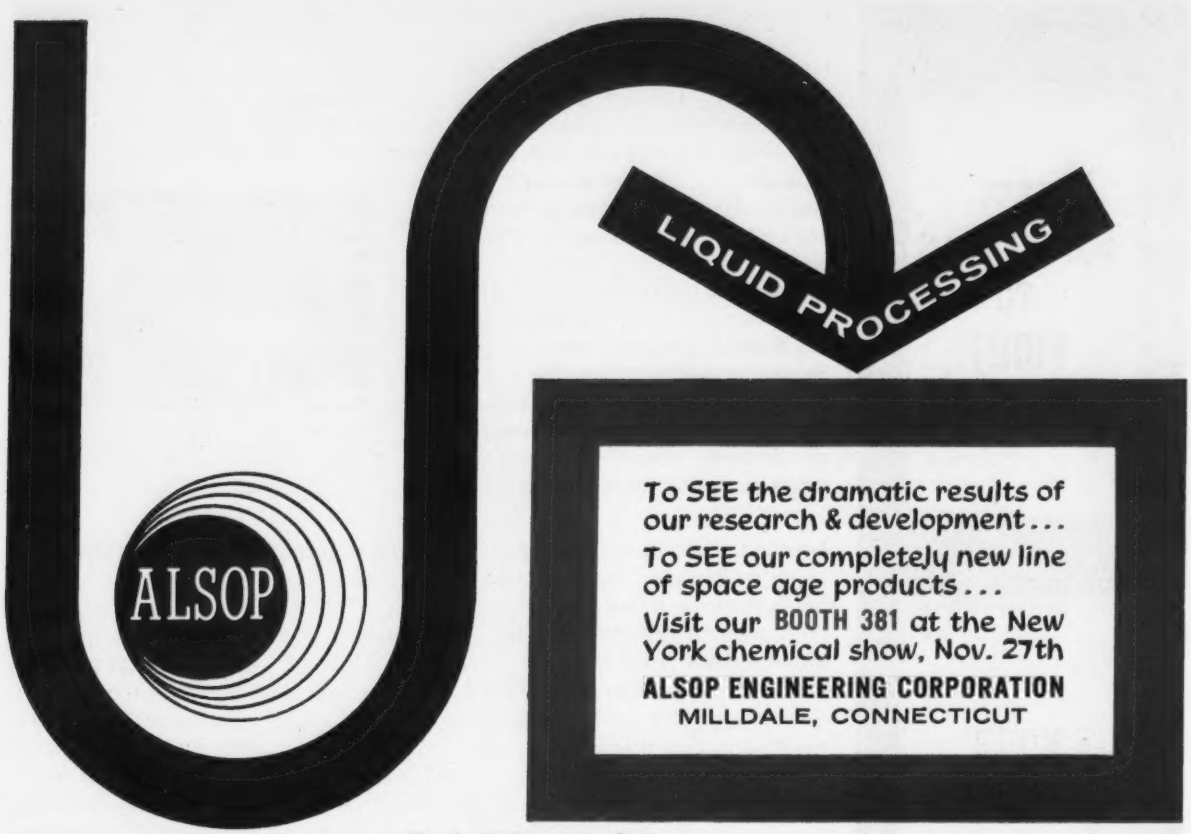
Displays, literature and expert counsel on the following: **F-C* (field-cut) Glasteel Pipe** featuring new line of flanged Glasteel Pipe fittings and inexpensive portable fire-polishing furnace . . . **Teflon envelope gasket** for 500-psi service . . . new **thermowell** with interchangeable tantalum-Glasteel tip . . . and **Project Engineering** services; all to be found in Booths No. 110 and No. 141. Of course, our Permutit Division will be featuring the latest advances in **water- and waste-treatment** equipment. See the **valveless filter** in animated operation; also **precipitators** and **packaged demineralizer** units will be displayed. **OFFER:** For a broad look at how Pfaudler Permutit equipment serves the chemical industry, write for **1962 Buyer's Guide.**

*Patent applied for.

Address your inquiry to our Pfaudler Division, Dept. CP-111, Rochester 3, New York. In Canada, contact Pfaudler Permutit Canada Ltd., Toronto.

PFAUDLER PERMUTIT INC.

Specialists in FLUIDICS . . . the science of fluid processes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ALSOP
To SEE the dramatic results of our research & development...
To SEE our completely new line of space age products...
Visit our BOOTH 381 at the New York chemical show, Nov. 27th
ALSOP ENGINEERING CORPORATION
MILLDALE, CONNECTICUT

Check 1566 opposite last page.

PRODUCT GUIDE

Name of Exhibitor	*Booth No.*
Hapman Corporation Conveyor Division	923
West Virginia Pulp and Paper Co. Industrial Chemical Div.	944
Croll-Reynolds Engineering Co., Inc.	1054-56
Lock Joint Pipe Co. Oscar Davis Co., Inc.	1078
Ronningen-Petter Co.	1113
The Madden Corporation	1136
United States Filter Co.	1139-41-43
Victaulic Co. of America	1190-92
The Corley Co., Inc.	1204
Benson Laboratories, Inc.	1381
Filtomor, Incorporated	1422
Radiation Applications Inc.	1438

Welding Equipment

General Dynamics Corporation Liquid Carbonic Div.	924-26
Kennametal Inc.	963

Wire Cloth

Newark Wire Cloth Company	183
Multi-Metal Wire Cloth Company, Inc.	214
The W. S. Tyler Co.	574
Keasbey & Mattison Co.	822
Bishop & Co. Platinum Works	936-938
Buffalo Wire Works Co., Inc.	1229
American Plant Equipment Company Pronoto Filters Div.	1282-84
Morland Associates	1383
The Cambridge Wire Cloth Company	1423

PROCESSING EQUIPMENT

Adsorption Equipment

Barnebey-Cheney	52
Commercial Filters Corp.	223
A. O. Smith Corporation	596
Du Verre, Inc.	889-891
Selas Corporation of America	979-981

Centrifuges

The De Laval Separator Co.	94
Pfaudler Permutit Inc.	110-141
Ivan Sorvall, Inc.	316
Scientific Glass Apparatus Co., Inc.	332
American Machine & Metals, Inc. Tolhurst Centrifugals Div.	456-506-556
The Sharples Corp. Fletcher Div.	459
Sharples Corporation	485
Dorr-Oliver Inc.	531
Bird Machine Company	559
Baker Perkins, Inc. Chemical Machinery Div.	560-609
Centrico, Inc.	842
American Tool and Machine Co.	862
Western Machinery Co. Wemco Div.	1044-46
The Western States Machine Co. Chemical Machinery Div.	1206-08-10

Classifiers

Separations Engineering Corp.	37
Sutton, Steele & Steele, Inc.	37
The De Laval Separator Co.	94
Sharples Corporation	485
Bird Machine Company	559
Hardinge Company, Inc.	582
Combustion Engineering, Inc. Raymond Div.	646
The Galigher Company	843
Blackstone Corporation, Majac Inc., Subs.	1087
Buell Engineering Company, Inc.	1189-93
Southwestern Engineering Co. Vibro-Equipment Div.	1250-52
Bauer Bros. Co.	1430-31

Cooling Towers, Spray Ponds, Humidifiers & Dehumidifiers

Niagara Blower Company	655

Only 'round the clock screening meets Maas' custom requirements

SWECO Vibro-Energy Separators operate 24 hours a day, seven days a week, at A. R. Maas Chemical Co., division of Stauffer Chemical Co., South Gate, Calif. Costly down-time and maintenance ordinarily caused by screen blinding are reduced to a minimum with SWECO's effective ball tray design. Maas installed one of the first SWECO Separators in 1953. Today, seven 48-inch, multiple-deck units handle its production of photo chemicals, organic chelating agents, and a complete line of sodium phosphates, all to exacting customer specifications. Units transmit no vibration so are easier and more economical to install, and they use only 1/3 of the normal power required. The SWECO Separator's quick screen change and longer screen life cut operating and maintenance costs. For full details, application data, or free screening demonstration in *your* plant with *your* materials, write SOUTHWESTERN ENGINEERING CO., 4800 Santa Fe Avenue Los Angeles 58, Calif., Dept. 34-3.

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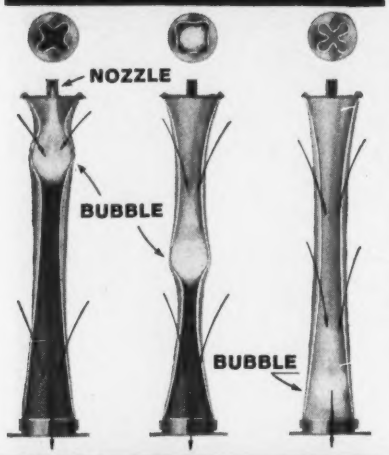
"INDUCTAIRE"
AIR BUBBLE CLEANING



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■ Dust trap eliminated ■ More effective, shorter cleaning cycle ■ Higher air/cloth ratios in less space ■ No shakers—no blow-back mechanisms ■ Dampers in clean air duct only—no other moving parts ■ Longer fabric life—bag changes easier, less frequent ■ Lower initial *and* maintenance costs.

It's all done with a gentle "bubble of air". You'll have to see it to believe it

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Check 1568 opposite last page.

PRODUCT GUIDE

Name of Exhibitor	*Booth No.*
Crushers & Rolls (Heavy)	
The Fitzpatrick Company	175
Sturtevant Mill Company	421
General American Transportation Corp. Fuller Co. Traylor Engineering & Mfg.	495
Sprout, Waldron Company, Inc.	846-847-848
Franklin P. Miller & Son, Inc. Supreme Div.	1010
Crystallizers	
Chicago Bridge & Iron Company	14
Whiting Corporation Swenson Evaporator Co., Div.	93
Henry Vogt Machine Co.	124-126
Dialysis Equipment	
Buchler Instruments, Inc.	369
Distillation Equipment	
Fred S. Carver, Inc.	90
Engelhard Industries, Inc.	192-196-225
Engelhard Industries, Inc. Amersil Quartz Div.	192-196-225
Star Tank & Filter Corp.	233
Schueler & Company Schuco Scientific Div.	345
Precision Scientific Co.	370-372
Hotpack Corp.	373-375
Scientific Development Co.	382
American Sterilizer Company Scientific and Industrial Div.	385
Barnstead Still and Sterilizer Co.	416
Dresser Industries, Inc. Podbielniak, Inc.	595
Artisan Industries, Inc.	874
Mooney Brothers Corp., Chem Flow Corp., Subs.	1045
Distillation Engineering Co.	1048
IBM Service Bureau Corp., Subs.	1070
Stainless Products Corp.	1158
Pack Column Corp.	1171
Cornell Machine Co.	1212-14
Rodney Hunt Machine Co. Process Equipment Div.	1240-44
James F. Scanlon	1440
Dryers	
Komline Sanderson Engineering Corp.	25
Paul O. Abbé Inc.	49
F. J. Stokes Corp.	67-38
The Jeffrey Manufacturing Co.	97
Standard Steel Corp.	122
The Patterson Foundry and Machine Co.	154
The Fitzpatrick Company	175
Chemetron Corp. Girdler Process Equipment Div.	219
American Sterilizer Company Scientific and Industrial Div.	385
General American Transportation Corp. Process Equipment Div.	436-442
General American Transportation Corp. Fuller Co. Traylor Engineering & Manufacturing	495
Baker Perkins, Inc. Chemical Machinery Div.	560-609
Blaw-Knox Company Buflovak Equipment Div.	581
Nichols Engineering & Research Corporation, Nerco-Niro Spray Dryer Div.	624
Combustion Engineering, Inc. Raymond Div.	646
Proctor & Schwartz, Inc. Food & Chemical Dryers Div.	684
Bowen Engineering, Inc.	706
Pall Corporation	812
Fluid Energy Processing & Equipment Co.	813
C. G. Sargent's Sons Corp.	817
Middle States Corporation Davenport Machine & Foundry Company, Div.	818
American Tool and Machine Co.	862
Tower Iron Works, Inc. Process Equipment Div.	977
Selas Corp. of America	979-981
Edw. Renneburg & Sons Co.	1012
Kennedy Van Saun Mfg. & Engr. Corp.	1036
The National Drying Machinery Co.	1112-14
Bowser, Inc. Process Filters Div.	1166-68-70
International Basic Economy Corp. The V. D. Anderson Co., Div.	1265
J. P. Devine Manufacturing Co.	1354-56
General Machine Company of New Jersey	1391
Bench Scale Equipment Co.	1405
Bethlehem Corp. Bethlehem Foundry & Machine Div., Process Equipment Div.	1426-1428

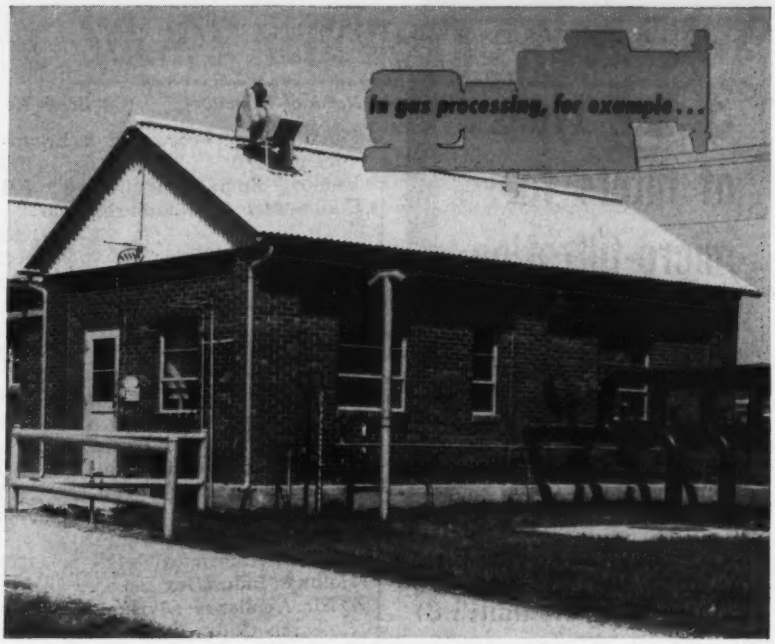
"I'm an avid reader . . ."

Name of Exhibitor	*Booth No.*
Dry-powder Mixers	
Paul O. Abbé Inc.	49
J. M. Lehmann Company, Inc.	60
Capitol Products Corp. Read Standard Div.	162
Bramley Machinery Corp.	187
Productive Equipment Corp.	224
J. H. Day Company	238
Sturtevant Mill Company	421
Baker Perkins, Inc. Chemical Machinery Div.	560-609
American Manufacturing Co., Inc. Entoleter, Inc.	590
Morehouse-Cowles Inc.	814
The Young Machinery Co., Inc.	833
Sprout, Waldron Company, Inc.	846-847-848
Tower Iron Works, Inc. Process Equipment Div.	977
Charles Ross & Son Co., Inc.	994-996

Drop in and see us

Have a suggestion? Or a complaint? Let's talk about it. We'll be in booth 880, on the third floor.

Franklin P. Miller & Son, Inc. Supreme Div.	1010
Rapids Machinery Co., Inc.	1162
Rietz Manufacturing Co.	1231
Littleford Bros., Inc. Mixer Div.	1262-64
The Strong-Scott Mfg. Co. Industrial Equipment Div.	1274-76-78
Vibra Screw Feeders Inc.	1296-98
J. P. Devine Mfg. Co.	1354-56
General Machine Co. of N.J.	1391
Schutz-O'Neill Company Parten Machinery, Div.	1400
First Machinery Corp. The Falcon Mfg. Div.	1418-20
Bauer Bros. Co.	1430-31
Dust & Mist Collectors	
The Day Company	45
W. W. Sly Manufacturing Co.	73
Otto H. York Co., Inc.	85
Bell International Corp. Wheelabrator Corp., Div.	193
General American Transportation Corp. Fuller Company	446
General American Transportation Corp. Fuller Company Dracco Division	495
American-Marietta Co. Pulverizing Machinery Co.	632
American Air Filter Co., Inc.	676
Pangborn Corp.	681
National Dust Collector Corp.	695
National Engineering Company Simpson Mix-Muller Div.	695
Automotive Rubber Company, Inc.	802-804



Pulsafeeder meters "skunk essence" with never a whiff of leakage

Metropolitan Utilities District of Omaha adds skunk-like odorants to natural gas to warn customers of leaks. At first there were problems: odorization varied with gas flow rates; odorizing equipment often broke down under high loads; neighbors complained about leakage of the odorant.

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If your material is hard to handle . . . if you're looking for accurate metering . . . if high maintenance costs are eating into your profit . . . it's time to put Pulsafeeder to work for you.

New, Informative Film "HARD TO HANDLE"

Tells the story of safe, accurate, metered-pumping. Now, know all the facts from origin—to development—to application of Pulsafeeder Metering Pumps.

30 enjoyable minutes in sound and full color. Write for further details and arrangements for showing at your plant or outside location of your choice.

WRITE for Catalog 59. Lapp Insulator Co., Inc. Process Equipment Division, 1323 Poplar Street, LeRoy, New York.

Lapp

"See our exhibit at the Chem Show"

Check 1569 opposite last page.

3 new types of filters for micro-filtration of liquids and gases

Featuring elements of

- PORCELAIN
- POROUS STAINLESS STEEL
- FINE STAINLESS STEEL SCREENS

See them at the show!

Booth 979

28th Exposition of Chemical Industries

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PRODUCT GUIDE

Name of Exhibitor	*Booth No.*
Fluid Energy Processing & Equipment Co.	813
Peabody Engineering Corp.	821
Continental Manufacturing Co.	876-1093
The Ducon Co., Inc.	990-992
Peerless Mfg. Company	1008
Union Industrial Equipment Corp.	1076
Centrifix Corporation	1180
Buell Engineering Company, Inc.	1189-93
Vac-U-Max	1195-97
International Basic Economy Corp. The V. D. Anderson Co., Div.	1265
Dustex Corp.	1299-1301
Joy Manufacturing Co. Western Precipitation Div.	1346-50-48
Morland Associates	1383
Hoffman Industries, Inc. Air Appliance Division	1394
Research-Cottrell, Inc.	1404
Torit Manufacturing Co.	1446

Electrochemical Equipment

I-T-E Circuit Breaker Company	64
Instrumentation Associates, Inc.	203
Technicon Controls, Inc.	320

Evaporators

Tranter Manufacturing, Inc. Platecoil Div.	10
Chicago Bridge & Iron Company	14
Fred S. Carver, Inc.	90
Whiting Corporation Swenson Evaporator Co., Div.	93
Dean Products, Inc. Dean Panel Coil Div.	184
Buchler Instruments, Inc.	369
General American Transportation Corp. Process Equipment Div.	436-442
Blaw-Knox Company Buflovak Equipment Div.	581
The Carbone Corporation Chemical Equipment Div.	803
Yuba Consolidated Industries, Inc.	882-884-886
Tower Iron Works, Inc. Process Equipment Div.	977
Rodney Hunt Machine Co. Process Equipment Div.	1240-44
A. P. V. Company, Inc.	1303
Thermal Research & Engineering Corp.	1349-51

Filters

Industrial Filter & Pump Mfg. Co.	15
Komline Sanderson Engineering Corp.	25
Barnebey-Cheney	52
Sparkler Manufacturing Co.	56
W. W. Sly Manufacturing Co.	73
The Eimco Corp.	80
Otto H. York Co., Inc.	85
Fred S. Carver, Inc.	90
Bell International Corp. Wheelabrator Corp., Div.	193
Hercules Filter Corp.	213
Multi-Metal Wire Cloth Company, Inc.	214

During and after the show

Want to check for things you might have missed? This month's issue of CHEMICAL PROCESSING magazine contains descriptions of the show's high points, tagged for easy spotting. Be sure and look it over.

Commercial Filters Corp.	223
Star Tank & Filter Corp.	233
Sethco Mfg. Corp. Sethco Sales Corp. Div.	293
Alsop Engineering Corporation	381
General American Transportation Corp. Infilco Inc.	435
American Machine and Metals, Inc. Filtration Engineers Div.	456-506-556
American Machine & Metals, Inc. Niagara Filters Div.	456-506-556
T. Shriver & Company, Inc.	473
The Duriron Co., Inc.	520-532
Dorr-Oliver Inc.	531
Bird Machine Company	559
The W. S. Tyler Co.	574
Ertel Engineering Corp.	623
Nichols Engineering & Research Corporation, Nerco-Niro Spray Dryer Div.	624
American Air Filter Co., Inc.	676
Pall Corporation	812
R. P. Adams Company, Inc.	836
Selas Corporation of America	979-981
Peerless Mfg. Company	1008
Mooney Brothers Corp., Chem Flow Corp., Subs.	1045
Croll-Reynolds Engineering Co., Inc.	1054-56
Screen Products, Inc.	1091
Ronningen-Petter Co.	1113
White Sewing Machine Corp. Strong Div.	1121
McCartney Manufacturing Company, Inc.	1129
United States Filter Co.	1139-41-43
Bowser, Inc. Process Filters Div.	1166-68-70
Wm. Steinen Manufacturing Co. Industrial Nozzle Div.	1194-96
American Plant Equipment Co. Pronto Filters Div.	1282-84
Filterite Corp.	1302
Terriss-Consolidated Industries	1313-15-17
Angola Alloy Fabricators, Inc.	1341

Name of Exhibitor	*Booth No.*
Joy Manufacturing Co. Western Precipitation Div.	1346-50-48
D. R. Sperry & Company	1362
Peterson Filters & Engineering Co.	1366-68-70
Technical Fabricators, Inc.	1372
Straight Line Filters, Inc.	1407
Hayward Filter Co.	1408
First Machinery Corp. The Falcon Manufacturing Div.	1418-20
Filtomor, Incorporated	1422
The Cambridge Wire Cloth Company	1423

Furnaces & Kilns

Standard Steel Corp.	122
Trent, Inc.	195
Hotpack Corp.	373-375
General American Transportation Corp. Fuller Co. Traylor Engineering & Manufacturing	495
Bartlett-Snow-Pacific, Inc.	569
Nichols Engineering & Research Corporation, Nerco-Niro Spray Dryer Div.	624
Middle States Corporation Davenport Machine & Foundry Company, Div.	818
Selas Corporation of America	979-981
Edw. Renneburg & Sons Co.	1012
Kennedy Van Saun Mfg. & Engr. Corp.	1036

Gas-adsorption Equipment

Barnebey-Cheney	52
W. W. Sly Manufacturing Co.	73
National Dust Collector Corp.	695
Automotive Rubber Company, Inc.	802-804

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Peabody Engineering Corp.	821
Distillation Engineering Co.	1048
Pack Column Corp.	1171
Heil Process Equipment Corp.	1305
Armstrong Machine Works	1359

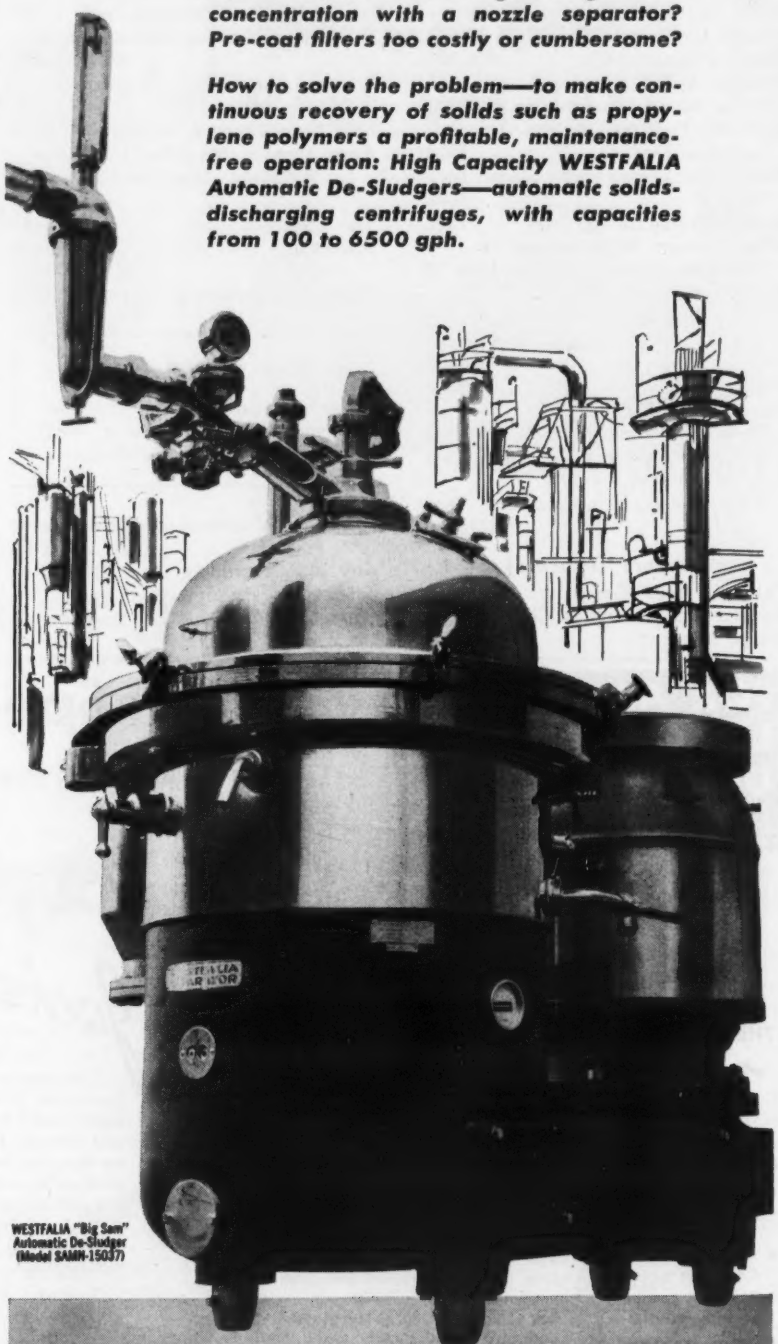
Hammer Mills and Fluid-energy Mills (Fine)

Manton-Gaulin Manufacturing Company, Inc.	51
The Fitzpatrick Company	175
Pulva Corp.	220
Sturtevant Mill Company	421
American Manufacturing Co., Inc. Entoleter, Inc.	590
American-Marietta Co. Pulverizing Machinery Co.	632

SOLIDS RECOVERY PROBLEMS?

Not getting high clarification efficiency with a decanter . . . or high enough solids concentration with a nozzle separator? Pre-coat filters too costly or cumbersome?

How to solve the problem—to make continuous recovery of solids such as propylene polymers a profitable, maintenance-free operation: High Capacity WESTFALIA Automatic De-Sludgers—automatic solids-discharging centrifuges, with capacities from 100 to 6500 gph.



WESTFALIA "Big Sam" Automatic De-Sludger (Model SAMN-15037)

SEE WESTFALIA AUTOMATIC DE-SLUDGERS AT BOOTH 842, CHEMICAL EXPOSITION, NEW YORK COLISEUM, NOV. 27-DEC. 1

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Check 1571 opposite last page.

Name of Exhibitor	*Booth No.*
Combustion Engineering, Inc. Raymond Div.	646
Fluid Energy Processing & Equipment Company	813
Prater Pulverizer Co.	904-906
Premier Mill Corp.	941
Charles Ross & Son Co., Inc.	994-996
Franklin P. Miller & Son, Inc. Supreme Div.	1010
Blackstone Corporation, Majac Inc., Subs.	1087
Rietz Manufacturing Co.	1231
Southwestern Engineering Co. Vibro-Equipment Div.	1250-52
The Strong-Scott Mfg. Co. Industrial Equipment Div.	1274-76-78
Union Process Co.	1329-31
Pallmann Pulverizers Co., Inc.	1373
Schutz-O'Neill Company Parten Machinery, Div.	1400
Thomas Engineering Co., Inc.	1406
First Machinery Corp. The Falcon Manufacturing Div.	1418-20

Heaters (Process)

Parks-Cramer Company	55
Schutte and Koerting Co.	61
Trent, Inc.	195
Fansteel Metallurgical Corporation Chemical & Metallurgical Div.	617
Black, Sivalls & Bryson, Inc.	685
Yuba Consolidated Industries, Inc.	882-884-886
Eclipse Lookout Co. Eclipse Boiler Div.	973
Edw. Renneburg & Sons Co.	1012
Aero Supply Manufacturing Co. L. J. Wing Manufacturing Co.	1094-96
The Johnson Corp.	1128-30
American Hydrotherm Corporation	1174-76
Pick Manufacturing Co.	1345

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Thermon Manufacturing Co., Inc.	1207-09
Joy Manufacturing Co. Western Precipitation Div.	1346-50-48
Thermal Research & Engineering Corp.	1349-51
Bethlehem Corp. Bethlehem Foundry & Machine Div., Process Equipment Div.	1426-28

Heat Exchangers

Tranter Manufacturing, Inc. Platecoil Div.	10
The Orville Simpson Company	68
The De Laval Separator Co.	94
Pfaudler Permutit Inc.	110-141
Henry Vogt Machine Co.	124-126
Falls Industries, Inc.	131
Corning Glass Works Technical Products Div.	134
Dean Products, Inc. Dean Panel Coil Div.	184
Chemetron Corp. Girdler Process Equipment Div.	219
Brabender Instruments, Inc.	340
General American Transportation Corp. Fuller Company	446
Union Carbide Corp. National Carbon Company, Div.	460
A. O. Smith Corporation	596
Fansteel Metallurgical Corporation Chemical & Metallurgical Div.	617
Pressed Steel Tank Co.	631
Niagara Blower Company	655
The Carbone Corporation Chemical Equipment Div.	803

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- Dry and Semi-Wet Chemical Powders
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- Soaps, Detergents and Sanitation Chemicals
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- Pharmaceuticals
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VISIT BOOTH NO. 1162

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RAPIDS MACHINERY COMPANY

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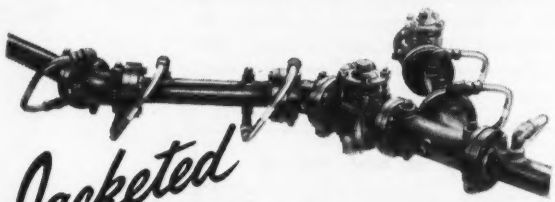
Check 1572 opposite last page.

Speed Handling

of Heavy, Sticky Materials



Jacketed

Piping, Valves, Fittings

The best method for making heavy, viscous materials flow more freely is to apply heat—and the best way to apply heat is through Parks-Cramer jacketed piping, valves and fittings. It is axiomatic that the greater the heating surface, the faster the heating; and, the less viscous the product becomes, the easier it is to handle. These conditions are met by full jackets completely surrounding all product wetted surfaces—thus utilizing maximum heat transfer area.

The largest selection of jacketed piping and accessories is available in materials ranging from semi-steel (in stock) to carbon and alloy steel, bronze, aluminum, Ductile Iron, Ni-Resist, and plastic lined in sizes from 1¼" to 8".

See our exhibit at Booth 55

Parks-Cramer Co.

PROCESS HEATING DEPARTMENT

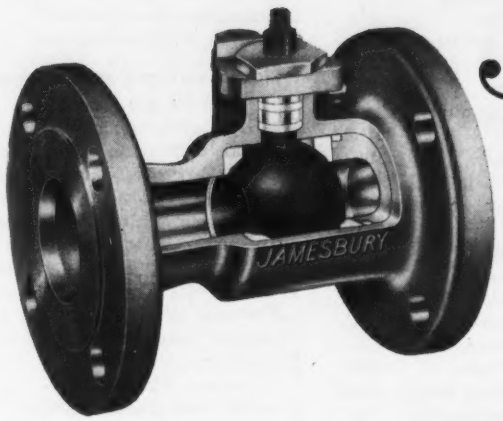
FITCHBURG 3, MASSACHUSETTS

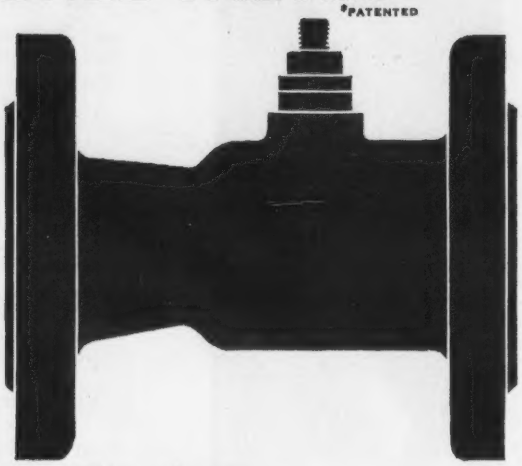
Check 1573 opposite last page.

FACTS You Should Know About

Jamesbury "Double-Seal"™ BALL VALVES*

*PATENTED





Jamesbury's compact UNIT BODY design gives leak-proof performance

The superior performance of Jamesbury "Double-Seal" Ball Valves is due to their patented design. There are no body joints in the Jamesbury Ball Valve. You get a valve of unit body construction — cast of one piece of metal. It is compact-rugged, capable of withstanding shocks and jolts, free of areas where leaks can occur.

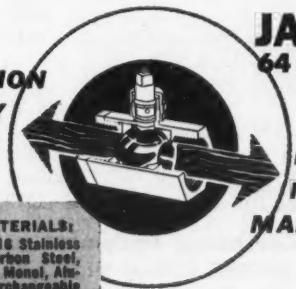
There are other features, too, about this unique valve which make it outstanding. There are no internal springs to corrode or become fouled up. The stem can be removed from the valve under pressure with the valve in full closed position with no leakage occurring. In fact, when the stem seals occasionally need replacing, this can be accomplished without even removing the valve from the line. Being the pioneer in the ball valve field, you'd naturally expect to get the broadest selection of materials from Jamesbury — *and you do,* plus a wide range of sizes!

Want more facts? Contact your nearest stocking distributor, or write us direct.

Send for Jamesbury Fluid Services Guide

JAMESBURY CORP.
64 New Street, Worcester, Mass.
DISTRIBUTORS IN PRINCIPAL CITIES

QUARTER TURN OPERATION
HIGH FLOW CAPACITY
ZERO LEAKAGE



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MINIMUM MAINTENANCE
MANUAL OR POWER OPERATION

WIDE RANGE OF SIZES:
Screwed end ¼" through 3"
Flanged 150# series ½" through 12" — 300# ½" through 8".
Larger sizes on request.

VARIETY OF MATERIALS:
Valves in 303 and 316 Stainless Steel, Alloy 20, Carbon Steel, Bronze, Ductile Iron, Monel, Aluminum and PVC. Interchangeable seats and seals in Teflon, Teflon compounds, Nylon, Buna-N, Neoprene, Hypalon and natural rubbers.

As Versatile As Industry Itself!

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See Our Exhibit At the Chemical Show

Check 1574 opposite last page.

You can *see* what's happening inside PYREX glass pipe. A quick survey along the line tells all—inside and out. No master detectives, no bloodhounds, nobody with x-ray eyes needed in a pinch.

Fact is, what you'd see if *you* were using PYREX glass pipe would be trouble-free operation. Dangerous *hidden* problems that corrosive chemicals produce in metallic piping are altogether eliminated.

That's because PYREX pipe delivers most fluids without a trace of corrosion. Problems of side reaction, pick-up, and contamination just don't develop — even at high temperatures. Clogging and caking are old hat, too—thanks to the slick, smooth surface of glass.

PYREX pipe actually costs less than most other corrosion-resisting materials when all installation costs are considered—much less when you include maintenance.

For the complete PYREX pipe story, write for a copy of Bulletin PE-3. Address: Plant Equipment Department, 2911 Crystal Street, Corning, New York.

CORNING GLASS WORKS
CORNING MEANS RESEARCH IN GLASS

"See our exhibit at the Chem Show"
Check 1575 opposite last page.

PRODUCT GUIDE

Name of Exhibitor	*Booth No.*
Peabody Engineering Corp.	821
R. P. Adams Company, Inc.	836
Crawford Fitting Company	844
Artisan Industries, Inc.	874
Yuba Consolidated Industries, Inc.	882-884-886
Cherry-Burrell Corp.	913
American Heat Reclaiming Corp.	1058-60-62
Carl Buck & Associates	1083
The Air Preheater Corp.	1104-06
American Hydrotherm Corporation	1174-76
Centrifix Corporation	1180
Rodney Hunt Machine Co. Process Equipment Div.	1240-44
Universal Oil Products Co. Catalytic Combustion Corp., Div.	1255
A. P. V. Company, Inc.	1303
Heil Process Equipment Corp.	1305
Angola Alloy Fabricators, Inc.	1341
Joy Manufacturing Co. Western Precipitation Div.	1346-50-48
York Corporation	1358-60

Impactors & Crushing Mills (Medium)

Paul O. Abbé Inc.	49
J. M. Lehmann Company, Inc.	60
The Jeffrey Manufacturing Co.	97
U. S. Stoneware Co. Alite Div.	111
The Patterson Foundry and Machine Co.	154
General American Transportation Corp. Fuller Co. Traylor Engineering & Manufacturing	495
Hardinge Company, Inc.	582
American Manufacturing Co., Inc. Entoleter, Inc.	590
American-Marietta Co. Pulverizing Machinery Co.	632
Allis-Chalmers Manufacturing Co. Industries Group	636
Combustion Engineering, Inc. Raymond Div.	646
The Young Machinery Co., Inc.	833
Franklin P. Miller & Son, Inc. Supreme Div.	1010
Kennedy Van Saun Mfg. & Engr. Corp.	1036
Rietz Manufacturing Co.	1231
The Strong-Scott Mfg. Co. Industrial Equipment Div.	1274-76-78
Schutz-O'Neill Company Parten Machinery, Div.	1400
Bauer Bros. Co.	1430-31
Pallmann Pulverizers Co., Inc.	1373

Ion-exchange Equipment

Industrial Filter & Pump Mfg. Co.	15
Sethco Mfg. Corp. Sethco Sales Corp. Div.	293
Barnstead Still and Sterilizer Co.	416
General American Transportation Corp. Infilco Incorporated	435
Illinois Water Treatment Co.	864
Sigmamotor, Inc.	1099
Radiation Applications Inc.	1438

Liquid-extraction Equipment

Otto H. York Co., Inc.	85
The De Laval Separator Co.	94
General American Transportation Corp. Process Equipment Div.	436-442
American Machine & Metals, Inc. Tolhurst Centrifugals Div.	456-506-556
The Sharples Corp. Fletcher Div.	459
Sharples Corporation	485
Blaw-Knox Company Chemical Plants Div.	581
Derrick Manufacturing Co.	811
Middle States Corporation Davenport Machine & Foundry Co., Div.	818
Artisan Industries, Inc.	874
Premier Mill Corp.	941
Peerless Mfg. Company	1008
Distillation Engineering Co.	1048
The National Drying Machinery Company	1112-14
International Basic Economy Corp. The V. D. Anderson Co., Div.	1265
Bauer Bros. Co.	1430-31

Liquids Mixers

Nettco Corporation	46
Manton-Gaulin Manufacturing Company, Inc.	51
J. M. Lehmann Company, Inc.	60
Schutte and Koerting Co.	61
Philadelphia Gear Corp.	123
Mixing Equipment Co., Inc.	146
The Patterson Foundry and Machine Co.	154
Tri-Homo Corporation	191
Gifford-Wood Company	234

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Name of Exhibitor	*Booth No.*
Ivan Sorvall, Inc.	316
Alsop Engineering Corporation	381
General American Transportation Corp. Process Equipment Div.	436-442
Chemicolloid Laboratories, Inc.	618
Morehouse-Cowles Inc.	814
Lawrence Pumps, Inc.	852
Cherry-Burrell Corp.	913
Premier Mill Corp.	941
Charles Ross & Son Co., Inc.	994-996
Western Machinery Co. Wemco Div.	1044-46
Hudson Industries Corp.	1095
Stainless Products Corp.	1158
Herman Hockmeyer & Co.	1178
Wood Conversion Company Sonic Engineering Corp., Subs.	1181

During and after the show

Want to check for things you might have missed? This month's issue of CHEMICAL PROCESSING magazine contains descriptions of the show's high points, tagged for easy spotting. Be sure and look it over.

Cornell Machine Co.	1212-14
Chemineer, Inc.	1220
Herman H. Sticht Co., Inc.	1280
Terriss-Consolidated Industries	1313-15-17
Schutz-O'Neill Company Parten Machinery, Div.	1400
The E. T. Oakes Corporation	1424

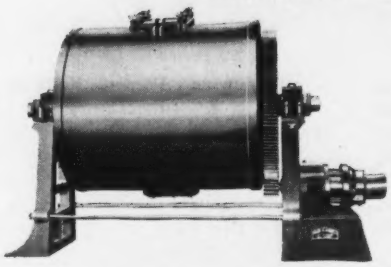
Paper Equipment

The W. S. Tyler Co.	574
The Johnson Corp.	1128-30

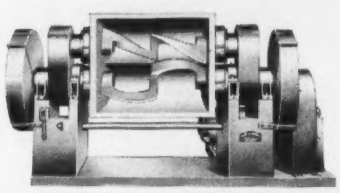
Pastes & Plastic-solids Mixers

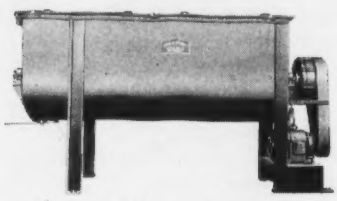
Paul O. Abbé Inc.	49
Capitol Products Corp. Read Standard Div.	162
Bramley Machinery Corp.	187
Gifford-Wood Company	234
J. H. Day Company	238
Baker Perkins, Inc. Chemical Machinery Div.	560-609
Chemicolloid Laboratories, Inc.	618
National Engineering Company Simpson Mix-Muller Div.	695
Morehouse-Cowles Inc.	814
Premier Mill Corp.	941
Herman Hockmeyer & Co.	1178
Rietz Manufacturing Co.	1231
Littleford Bros., Inc. Mixer Div.	1262-64
The Strong-Scott Mfg. Co. Industrial Equipment Div.	1274-76-78
J. P. Devine Manufacturing Co.	1354-56

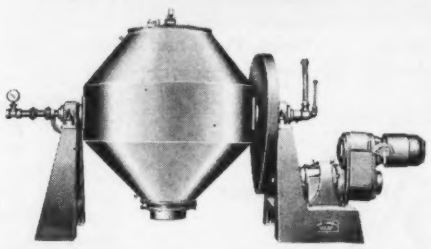
SEE These 5 PAUL O. ABBÉ MACHINES

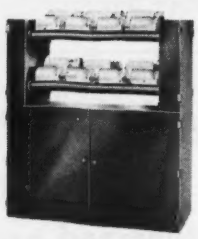


at the 28th EXPOSITION of CHEMICAL INDUSTRIES Booth 49









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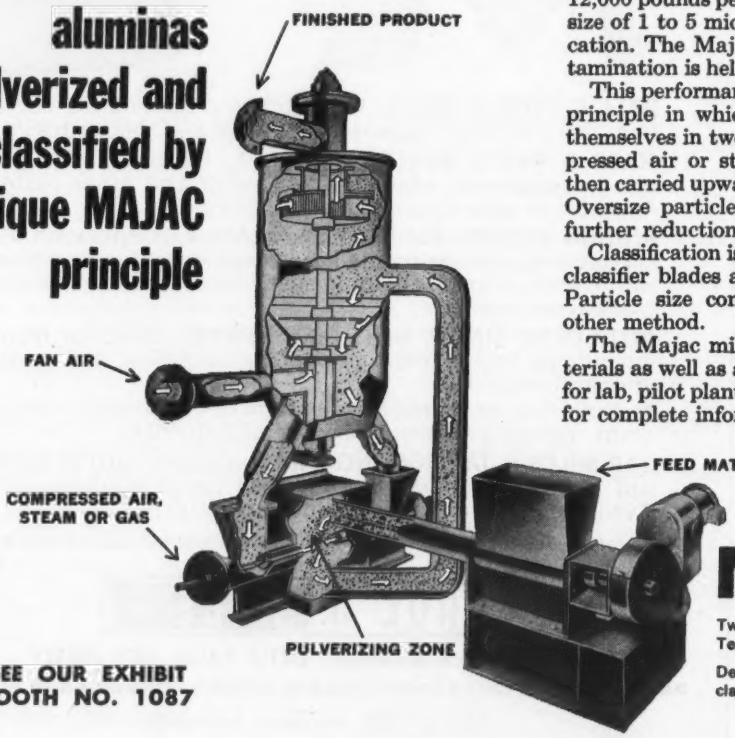
Check 1576 opposite last page.

Name of Exhibitor	*Booth No.*
Pelletizers	
Taylor, Stiles & Co.	1347
Pharmaceutical Equipment	
Sparkler Manufacturing Co.	56
F. J. Stokes Corp.	38-67
Snyder Corporation Arthur Colton Co.	98
Glengarry Processes, Inc.	121
Capitol Products Corp. Read Standard Div.	162
The Fitzpatrick Company	175
Tri-Homo Corporation	191
Trent, Inc.	195
Great Western Mfg. Co.	216
Gifford-Wood Company	234
Alsop Engineering Corporation	381
Georgia Marble Co. Alberene Stone	465
Chemicolloid Laboratories, Inc.	618
Ertel Engineering Corp.	623
Bowen Engineering, Inc.	706
Fluid Energy Processing & Equipment Co.	813
Abbott Laboratories	918
Michigan Chemical Corporation	942
Metal Hydrides Inc.	964
Herman Hockmeyer & Co.	1178
Littleford Bros., Inc. Mixer Division	1262-64
Hapman Corporation Conveyor Div.	923
Lee Metal Products Co., Inc.	1384
General Machine Company of New Jersey	1391
Thomas Engineering Co., Inc.	1406
The Burnet Company Production Equipment Inc., Div.	1442
Reactors, Tanks, Kettles & Autoclaves	
Tranter Manufacturing, Inc. Platecoil Div.	10
Pfaudler Permutit Inc.	110-141
U. S. Stoneware Co. Alite Div.	111
Falls Industries, Inc.	131
Corning Glass Works Technical Products Div.	134
The Patterson Foundry and Machine Co.	154
Trent, Inc.	195
Chemetron Corp. Girdler Process Equipment Div.	219
Star Tank & Filter Corp.	233
Gifford-Wood Company	234
Autoclave Engineers Sales Corp.	346
General American Transportation Corp. Plate and Welding	436-442
The International Nickel Co., Inc.	509
Haveg Industries, Inc.	546
Blaw-Knox Company Chemical Plants Div.	581
A. O. Smith Corporation	596
Chemicolloid Laboratories, Inc.	618
Ertel Engineering Corp.	623
The Carbone Corporation Chemical Equipment Div.	803
Artisan Industries, Inc.	874
Du Verre, Inc.	889-891
Bishop & Co. Platinum Works	936-938
Delaware Barrel & Drum Company, Inc.	953-955
Pennsylvania Fluorocarbon Co., Inc.	969
Tower Iron Works, Inc. Process Equipment Div.	977
Edw. Renneburg & Sons Co.	1012
Louis DeMarkus Corp.	1030
Crucible Steel Company of America Titanium Div.	1151-53-55-57
Stainless Products Corp.	1158
Herman Hockmeyer & Co.	1178
Terriss-Consolidated Industries	1313-15-17
Angola Alloy Fabricators, Inc.	1341

Hard abrasive aluminas pulverized and classified by unique MAJAC principle



SEE OUR EXHIBIT BOOTH NO. 1087

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This performance is the result of a unique pulverizing principle in which the particles are impacted against themselves in two opposing high-speed streams of compressed air or steam. Particles of the proper size are then carried upward and out of the mill by an air stream. Oversize particles are returned to the jet streams for further reduction.

Classification is accomplished by varying the speed of classifier blades and the amount of fan air introduced. Particle size control is more precise than with any other method.

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Designers and manufacturers of pulverizing, classifying and separating equipment for industry.

Check 1577 opposite last page.

5200 *PSIG*—54" Diameter—Removable Bundle

for W. R. Grace & Co.

Ammonia-Urea Plant

by Vogt

This water cooled, high pressure, NH_3 Condenser is installed in the W. R. Grace & Co., Nitrogen Products Division Ammonia-Urea Plant, Memphis, Tennessee. It was selected by the Chemical Construction Corporation, one of the top designers and constructors of chemical plants, and is designed for 5200 psig at 450°F. to condense NH_3 from a synthesis gas mixture.

Vogt engineers are available to help develop the right equipment to meet the problems peculiar to your plant processes, without obligation.

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Describes standard and special built Vogt heat exchangers and is available upon request. Address Dept. 24A-XCP.

HEAT TRANSFER EQUIPMENT

Check 1578 opposite last page.

Name of Exhibitor	*Booth No.*
J. P. Devine Manufacturing Co.	1354-56
Lee Metal Products Co., Inc.	1384
Bench Scale Equipment Co.	1405
First Machinery Corp.	
The Falcon Manufacturing Div.	1418-20
Bethlehem Corp.	
Bethlehem Foundry & Machine Div.	
Process Equipment Division	1426-28

Refrigeration Equipment

Tranter Manufacturing, Inc.	
Platecoil Div.	10
Instrumentation Associates, Inc.	203
Hotpack Corp.	373-375
Niagara Blower Company	655
Frick Company	1289-91
York Corporation	1358-60

Screens

Separations Engineering Corp.	37
J. M. Lehmann Company, Inc.	60
The Orville Simpson Company	68
Otto H. York Co., Inc.	85
Newark Wire Cloth Company	183
Multi-Metal Wire Cloth Company, Inc.	214
Great Western Manufacturing Co.	216
Productive Equipment Corp.	224
J. H. Day Company	238
American Machine & Metals, Inc. Niagara Filters Div.	456-506-556
The W. S. Tyler Co.	574
American Manufacturing Co., Inc. Entoleter, Inc.	590
Derrick Manufacturing Co.	811
Sprout, Waldron Company, Inc.	846-847-848
Eriez Manufacturing Co.	909-911

Drop in and see us

Have a suggestion? Or a complaint? Let's talk about it. We'll be in booth 880, on the third floor.

B. F. Gump Co.	1022-24-26
NoVo Industrial Corp., Mitchell Specialty Division	1039
Croll-Reynolds Engineering Co., Inc.	1054-56
Screen Products, Inc.	1091
Ronningen-Petter Co.	1113
Buffalo Wire Works Co., Inc.	1229
Southwestern Engineering Co. Vibro-Equipment Div.	1250-52
American Plant Equipment Company Pronto Filters Div.	1282-84
Technical Fabricators, Inc.	1372
The Cambridge Wire Cloth Company	1423

Sedimentation Equipment

American Machine & Metals, Inc. Tolhurst Centrifugals Div.	456-506-556
Dorr-Oliver Inc.	531

Size-enlargement Equipment

Dravo Corp.	1100
California Pellet Mill Company Process Pelleting Div.	1257-59

Spray Nozzles

Spraying Systems Company	914
Wm. Steinen Manufacturing Co. Industrial Nozzle Div.	1194-96
Spray Engineering Co.	1434

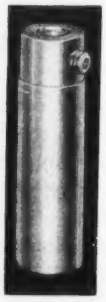
Waste-treatment Equipment

Industrial Filter & Pump Mfg. Co.	15
Komline Sanderson Engineering Corp.	25
Sparkler Manufacturing Co.	56

NORCROSS **VISCOMETERS**

for Automatically Measuring Viscosity in the process with the

PROVEN FALLING PISTON



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1-Solvent Control—Solvent is automatically added to correct for evaporation losses in Finishing (flow coating, dipping and spraying), Wire Coating (enamel, plastic, rubber, etc.), Rotogravure Printing, Sizing and various coating processes.

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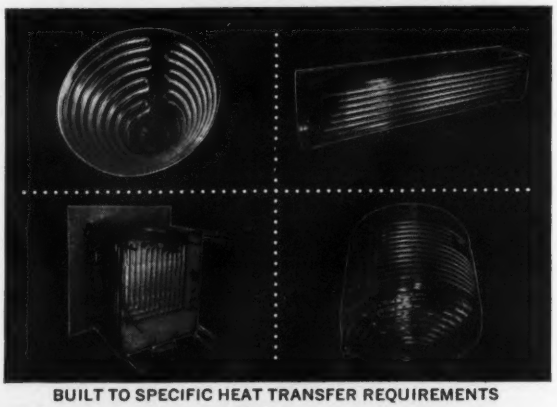

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Tranter PLATECOIL eliminates engineering and fabricating pipe coils for a wide variety of heat transfer requirements. Tranter will deliver to you, the complete package required for any specific need—including the vessel itself. PLATECOIL provides high heat transfer efficiency and low operating and maintenance costs.

PLATECOIL can be furnished to comply with ASME Code

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PLATECOIL® DIVISION

heat transfer specialists

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Raymond Division

COMBUSTION ENGINEERING, INC.

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BOOTH NO. 646

Check 1581 opposite last page.

Name of Exhibitor	*Booth No.*
The Eimco Corp.	80
Fred S. Carver, Inc.	90
Link-Belt Company	165
General American Transportation Corp. Infilco Incorporated	435
American Machine and Metals, Inc. Filtration Engineers Div.	456-506-556
Nichols Engineering & Research Corporation, Nerco-Niro Spray Dryer Div.	624
Norcross Companies, Kem-Feed Div.	868
Hapman Corporation Conveyor Division	923
Croll-Reynolds Engineering Co., Inc.	1054-56
Sigmamotor, Inc.	1099
Thermal Research & Engineering Corp.	1349-51
Peterson Filters & Engineering Co.	1366-68-70
Pallmann Pulverizers Co., Inc.	1373
Oxy-Catalyst, Inc. Industrial Department	1413
Filtomor, Incorporated	1422
Radiation Applications Inc.	1438

PROCESS INSTRUMENTATION & CONTROL

Chemical-composition Meters & Analyzers

Instrumentation Associates, Inc.	203
Technicon Controls, Inc.	320
New Brunswick Scientific Co., Inc.	324
Beckman Instruments, Inc. Scientific & Process Instruments Div.	333

During and after the show

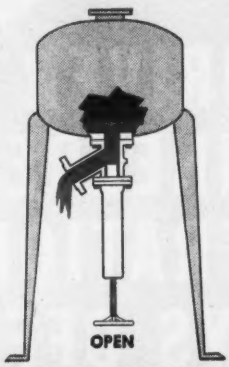
Want to check for things you might have missed? This month's issue of CHEMICAL PROCESSING magazine contains descriptions of the show's high points, tagged for easy spotting. Be sure and look it over.

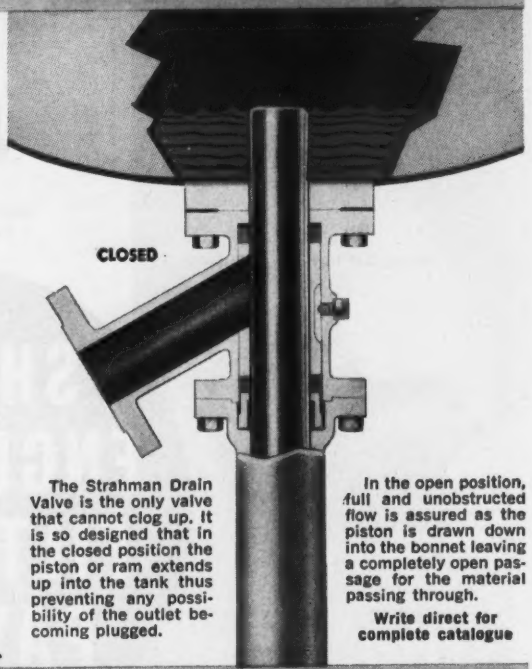
Schueler & Company Schuco Scientific Div.	345
Cambridge Instrument Co., Inc.	376
The Perkin-Elmer Corporation	386
Photovolt Corp.	389
Analytical Measurements, Inc.	395
Milton Roy Co., Serfass Corporation	675
McNab, Incorporated	935
Hallikainen Instruments	1186
Industrial Nucleonics Corp.	1374-76-78
The Welsbach Corp. Ozone Processes Div.	1410

Strahman RAM TYPE DRAIN VALVES

FLUSH BOTTOM VALVE THAT WILL NOT CLOG

Designed for Chemical and Pharmaceutical industries





The Strahman Drain Valve is the only valve that cannot clog up. It is so designed that in the closed position the piston or ram extends up into the tank thus preventing any possibility of the outlet becoming plugged.

In the open position, full and unobstructed flow is assured as the piston is drawn down into the bonnet leaving a completely open passage for the material passing through.

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STRAHMAN VALVES INC. NICOLET AVENUE FLORHAM PARK, N. J.

"See our exhibit at the Chem Show" Check 1582 opposite last page.

"TWIN DAVENPORTS"

Loaded and ready for shipment to a large midwestern grain processing plant for handling their drying requirements. Another "Davenport" dryer installation sized, designed and built for a particular drying job and years of productive service life.

Our Engineers will be happy to discuss your drying problems with you. Ask for our Catalog C and about our Pilot Plant Service. For quick reference, see your Chemical Engineering Catalog.

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DAVENPORT MACHINE AND Foundry Company
A DIVISION OF MIDDLE STATES CORPORATION
Davenport, Iowa, U.S.A.

DAVENPORT

PRESSING — DRYING and COOLING Equipment

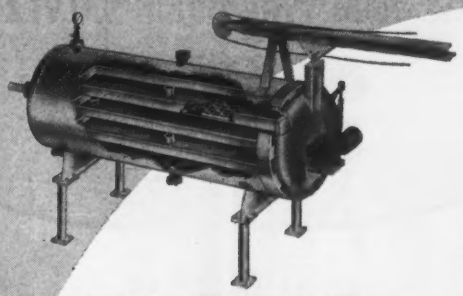
Continuous DeWatering Presses

ROTARY DRYERS Steam Tube, Hot Air and Direct Fire

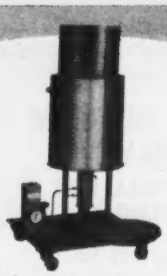
Atmospheric DRUM DRYERS

ROTARY COOLERS Water and Air

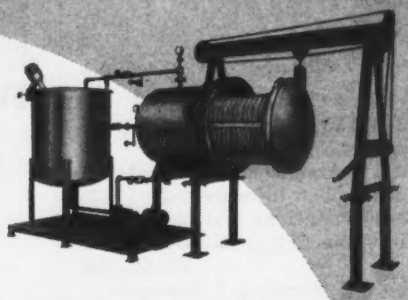
Check 1583 opposite last page.



Horizontal tray filter–Bulletin 152.

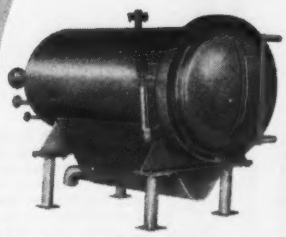


Horizontal plate filter –Bulletin 138A.

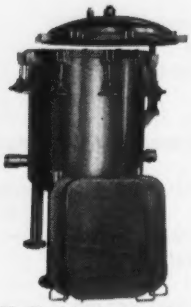


Vertical leaf, horizontal tank filter –Bulletin 150.

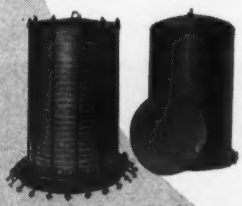
SHRIVER ENGINEERED FILTRATION PAYS OFF



Rotary leaf sluicing filter –Bulletin 154.



Vertical leaf, vertical tank filter. –Bulletin 150.



Hood type, horizontal plate filter–Bulletin 153.

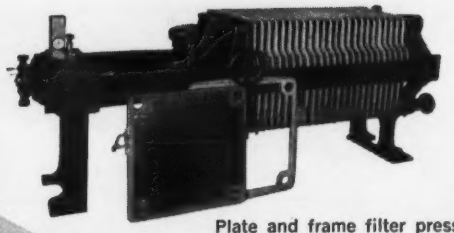


Plate and frame filter press –Catalog 59.

Continuous thickener–Bulletin 147.

Engineered filtration is the quality performance you get from Shriver filters, designed right down to every detail for your particular processing requirements.

Every filtration problem is investigated, with the support of laboratory and pilot tests, and evaluated to permit selection of the most suitable Shriver filter. Where the analysis indicates a filter not of our manufacture, we tell you so frankly.

There is extra engineering and performance value in the unbiased recommendations that come from Shriver. Let us work with you on your filtration equipment programs.

FILTERS AND COMPLETE FILTER STATIONS TO MEET YOUR EXACT PROCESSING NEEDS

T. Shriver & Company, Inc.

846 HAMILTON STREET • HARRISON, N. J.

Sales offices in principal cities

"See our exhibit at the Chem Show"

Check 1584 opposite last page.

Name of Exhibitor	*Booth No.*
Waters Associates	1425
Computers & Data-processing Equipment	
Toledo Scale Corporation Toledo Scale Div.	157
Thompson Ramo Wooldridge Inc. TRW Computers Co., Div.	176
Bailey Meter Company	610
IBM Service Bureau Corp., Subs.	1070
Controlled-volume Pumps	
Manton-Gaulin Manufacturing Company, Inc.	51
American Meter Company, Inc. Pump Division	150
New Brunswick Scientific Co., Inc.	324
New York Air Brake Co. B-I-F Industries, Inc., Div.	660
Milton Roy Co., Serfass Corporation	675
Wallace & Tiernan, Inc.	686
Lapp Insulator Co. Process Equipment Div.	696
Economy Faucet Co. Eco Engineering Co.	978
Kraloy/Chemtrol Co.	1111
McCartney Manufacturing Company, Inc.	1129
The Madden Corporation	1136
F. B. Stevens, Inc. Clark-Cooper Div.	1138-42
Wood Conversion Company Sonic Engineering Corp., Subs.	1181
Hills-McCanna Co.	1307-09
Benson Laboratories, Inc.	1381
Waukesha Foundry Company	1387-89

"Thanks for the order. Where shall we deliver your truckload of green stamps?"

Name of Exhibitor	*Booth No.*
Controllers	
Burling Instrument Co., Inc.	9
Leeds & Northrup Co.	50
Rockwell Manufacturing Co.	69
Eaton Manufacturing Co. Cleveland Worm and Gear Div.	74
Taylor Instrument Companies	104
Hoke Inc.	163
Lauda Instruments, Inc.	329
Beckman Instruments, Inc. Scientific & Process Instruments Div.	333
Research Controls, Inc.	366
Scientific Development Co.	382
Norcross Corporation	443
Fischer & Porter Company	528
Worthington Corp. Mason-Neilan, Div.	545
Bailey Meter Company	610
The Superior Electric Co.	810

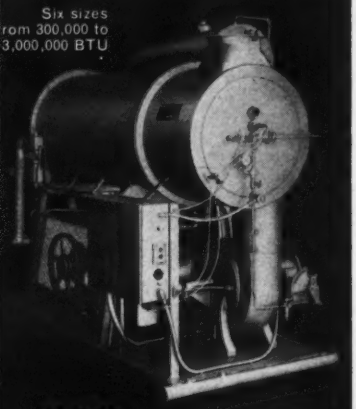
Drop in and see us

Have a suggestion? Or a complaint? Let's talk about it. We'll be in booth 880, on the third floor.

Magnetrol Inc.	910-912
McNab, Incorporated	935
Hastings-Raydist, Inc.	1020
The J. L. Putnam Co., Inc.	1040-42
H. O. Trerice Co.	1287
Leslie Co.	1333
ACF Industries, Inc. ACF Electronics Division	1353
Industrial Nucleonics Corp.	1374-76-78
Waters Associates	1425
Control Valves & Actuators	
Parks-Cramer Company	55
Rockwell Manufacturing Co.	69
Philadelphia Gear Corp.	123
Research Controls, Inc.	366
Minneapolis-Honeywell Regulator Company	635
Allis-Chalmers Manufacturing Co. Industries Group	636
The Superior Electric Co.	810
Strahman Valves, Inc.	815
DeZurick Corp.	907
Jamesbury Corp.	983-985
Automatic Switch Co.	984-986
Hydromatics, Inc.	1032-34
The J. L. Putnam Co., Inc.	1040-42
Mooney Brothers Corp., Chem Flow Corp., Subs.	1045
American-Standard Controls Division	1068
Worcester Valve Co., Inc.	1164-66
Hydril Company	1188
Alloy Products Corp.	1205
Pacific Valves, Inc.	1266
Valcor Engineering Corp.	1283

UP TO 600° F. TEMPERATURE WITHOUT HIGH PRESSURES!

Six sizes from 300,000 to 13,000,000 BTU

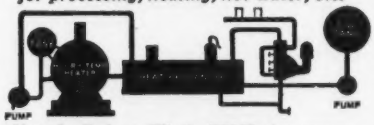


VAPOR HI·R·TEMP* HOT OIL HEATER

HI·R·TEMP is a forced-circulation heater using a non-toxic, non-corrosive oil as the heat medium. Temperatures to 600°F. can be obtained without pressure, eliminating use of high-pressure vessels and piping. One pump serves both heater and circulating system. Wherever high temperature process heat is required, you can count on the Vapor HI·R·TEMP Hot Oil Heater to do the job.

- Modulating controls automatically maintain pre-determined temperature of heat transfer oil.
- No water treatment needed. Eliminates cost of treatment system.
- Rotary gear pump assures uniform circulation . . . prevents hot-spots, coking, sludging, oil breakdown.
- Low-installation cost. Completely unitized, skid-mounted.
- Built to ASME codes. Flame failure, low oil level, high temperature safety shut-off controls are standard.
- Low operating cost.

here's how one Vapor HI·R·TEMP, with heat exchangers, can supply your needs for processing, heating, hot water, etc.



Heated oil from HI • R • TEMP (at temperatures to 600° F.) passes through heat exchangers to provide steam for processing; at 450° for steam for heating plant and office; at 200° for hot water for cleaning.

Visit our Booth 1028
28th Exposition of Chem. Indus.
Coliseum, New York
November 27—December 1

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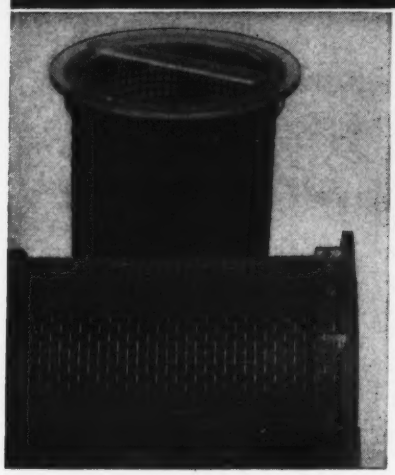
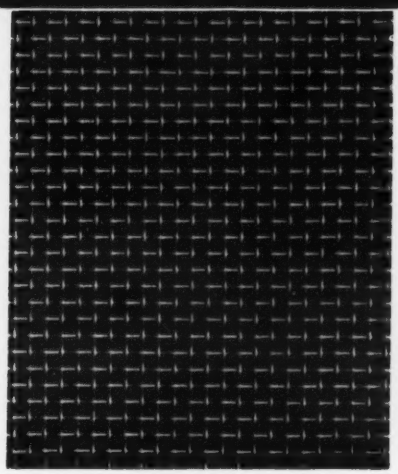
80 East Jackson Boulevard, Chicago 4 • Dept. 3-K

Check 1585 opposite last page.

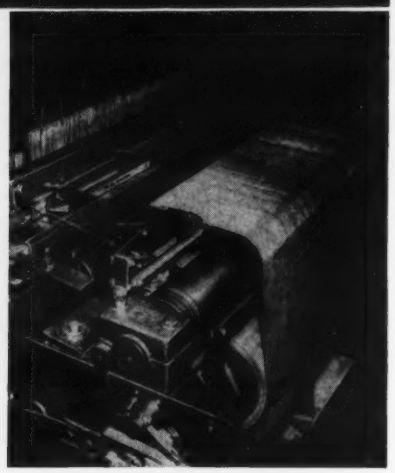
Need Wire Cloth in Special Metals? call *Cambridge*



HASTELLOY C*



SILVER



TITANIUM

Working with unusual metals or alloys—as well as with standard metals and alloys—is almost an everyday occurrence at Cambridge. For instance, not too long ago, we developed the first practical method of weaving titanium into wire cloth—with mesh counts far higher than had been expected by the customer. Platinum, lead, stainless steel, or bronze—whatever the metal or alloy used, Cambridge has the experience and facilities to produce wire cloth in any size or quantities to the closest tolerances.

If you require fabrications—of any shape or size—Cambridge has the craftsmen and know-how to fill even the most rigid specifications. Or, we'll draw up prints for your approval. There's a wire cloth expert near you—ready to discuss your needs and show you how to get what you want economically and on time. He's your Cambridge Field Engineer... and his name is listed in the Yellow Pages under "Wire Cloth." Or, write for our illustrated, 120-page catalog.

Refer to our technical data sheets in CHEMICAL ENGINEERING CATALOG, Page 185

The Cambridge Wire Cloth Co.

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Manufacturers of Wire Cloth, Wire Cloth Fabrications, Metal-Mesh Conveyor Belts and Gripper® Metal-Mesh Slings.

*Reg. T.M. of Union Carbide Co.

"See our exhibit at the Chem Show"

Name of Exhibitor	*Booth No.*
H. O. Trerice Co.	1287
Robertshaw-Fulton Controls Co. Fulton Sylphon Div.	1293
Hills-McCanna Co.	1307-09
Leslie Co.	1333
The Okadee Company	1342
General Machine Company of New Jersey	1391
George W. Dahl Co., Inc.	1427
Clayton Mark & Company Forged Steel Products Div.	1435

Flowmeters

Rockwell Manufacturing Co.	69
Taylor Instrument Companies	104
Hoke Inc.	163
Fischer & Porter Company	528
Black, Sivalls & Bryson, Inc.	685
Wallace & Tiernan, Inc.	686
Brooks Instrument Company, Inc.	998
Hastings-Raydist, Inc.	1020
Bowser, Inc. Process Filters Div.	1166-68-70
The Okadee Company	1342
McIntosh Equipment Corp., Process Equipment & Specialties Stocking Div. Walker, Crosweller Div.	1343
Jacoby-Tarbox Corporation	1362

Indicators, Recorders, Alarms & Signal-transmission Equipment

Burling Instrument Co., Inc.	9
Leeds & Northrup Co.	50
Schutte and Koerting Co.	61
Yarnall-Waring Co.	81
Taylor Instrument Companies	104
Toledo Scale Corporation Toledo Scale Div.	157
Mine Safety Appliances Co.	158
New Brunswick Scientific Co., Inc.	324
Beckman Instruments, Inc. Scientific & Process Instruments Div.	333
Uehling Instrument Co.	364
Cambridge Instrument Co., Inc.	376
Photovolt Corp.	389
Analytical Measurements, Inc.	395
Norcross Corporation	443
American Instrument Co., Inc.	445
General American Transportation Corp. Fuller Company	446
Fischer & Porter Company	528
Bailey Meter Company	610
Minneapolis-Honeywell Regulator Company	635
McGraw-Edison Co., Thomas A. Edison Industries, Instrument Div.	908
Magnetrol Inc.	910-912
McNab, Incorporated	935
Brooks Instrument Co. Inc.	998
Hastings-Raydist, Inc.	1020

Name of Exhibitor	*Booth No.*
Union Industrial Equipment Corp.	1076
LKB Instruments, Inc.	1116
F. B. Stevens, Inc. Clark-Cooper Div.	1138-42
Gulton Industries West Instrument Corp., Subs.	1226-28
Conax Corp.	1230
Herman H. Sticht Co., Inc.	1280
American Plant Equipment Company Pronto Filters Div.	1282-84
Jacoby-Tarbox Corporation	1362

Liquid-level-measurement Devices

Yarnall-Waring Co.	81
Uehling Instrument Co.	364
Fischer & Porter Company	528
Worthington Corp. Mason-Neilan, Div.	545
Minneapolis-Honeywell Regulator Company	635
Milton Roy Co., Serfass Corporation	675

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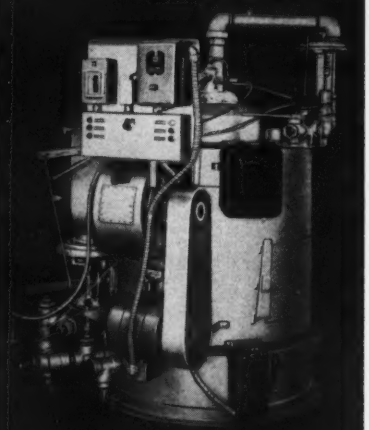
Magnetrol Inc.	910-912
Jerguson Gage & Valve Co.	989
Brooks Instrument Company Inc.	998
American-Standard Controls Division	1068
The Bastian-Blessing Company Rego Division	1122
Gulton Industries West Instrument Corp., Subs.	1226-28
Robertshaw-Fulton Controls Co. Fulton Sylphon Div.	1293
Gems Co.	1343
Charles F. Warrick Co.	1343
Industrial Nucleonics Corp.	1374-76-78

Moisture, Humidity & Dewpoint Meters

Mine Safety Appliances Company	158
Brabender Instruments, Inc.	340
Cambridge Instrument Co., Inc.	376
Brabender Corporation	390

FOR STEAM AT TEMPERATURES OF 600 TO 1000° F.!



VAPOR

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STEAM OR AIR SUPER HEATERS

CHECK THESE ADVANTAGES:

ACCURATE TEMPERATURE CONTROL. Pneumatically operated, very sensitive control system maintains constant temperatures within ± 9° F.

EASY TO INSTALL. Deliver completely assembled, fully wired, factory tested and adjusted.

FITS ANYWHERE. Takes less than 16 sq. ft. of floor space.

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FULL SAFETY CONTROLS. Electronic control outfire protection; temperature limit, and loss of combustion air controls. Conforms to ASME requirements; UL approved; Hartford inspected and National Boarded. Other approvals secured as needed.

DURABLE. Stainless steel coil (for 1000°); alloy steel coil (for 600°), give long service life under high temperatures and pressures.

CAPACITIES to 5000 lbs/hr @ 600 psi, thermal outputs to 1,000,000 btu/hr.

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28th Exposition of Chem. Indus.
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80 East Jackson Boulevard
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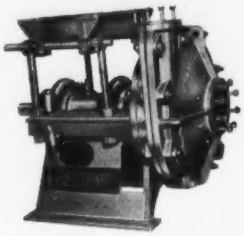
Check 1587 opposite last page.

STARS of the CHEMICAL SHOW

THE CHAMP

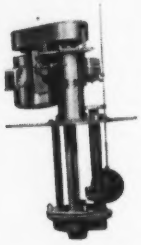
GALIGHER VACSEAL PUMP



World renown for outstanding performance, VACSEAL is an international favorite for difficult pumping roles. Its exclusive impeller design eliminates gland leakage and sealing water is not required. Impellers and replaceable, non-collapsible liners are furnished in a wide selection of materials for corrosive and/or abrasive service. Immediate booking is available in your plant in a wide selection of sizes to suit your pumping needs.

TOUGH GUY

GALIGHER VERTICAL SUMP PUMP



A star performer in roles of tough corrosive and/or abrasive service, this pump is widely noted for its trouble-free performance. There are no mechanical seals, packing or submerged bearings. Its double-suction design positively prevents airlock – the thrustless impeller design means lower maintenance costs and less down time for either intermittent or continuous operation. It is suited for a wide variety of pumping roles and is available in alternate materials of construction for acid-proof service.

OLD RELIABLE

GALIGHER SAMPLER

The number one favorite for automatic representative sampling of all types of materials, the Galigher Sampler has received numerous "rave notices" by plant foremen, operators and owners alike.

SUPPORTING CAST

GALIGHER SQUEEZE VALVE – GALIGHER DELTA VALVE

Fan mail shows the straight-through flow and replaceable diaphragms of these two valves have established them as leaders in material process flow control. Valve bodies as well as the replaceable diaphragms are available in materials suited for acid and abrasion service. See them at the show.

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GALIGHER PRODUCTS: AGITAIR Flotation* Machine, VACSEAL Pump, Geary-Jennings Sampler, Acid-proof Sump Pump, Galigher DELTA® Valves, Galigher Squeeze Valves, Rubber Lined and Covered Products, Plastic Fabrication.

Check 1588 opposite last page.

Name of Exhibitor	*Booth No.*
McGraw-Edison Co., Thomas A. Edison Industries, Instrument Div.	908

Pressure-measurement Devices

Yarnall-Waring Co.	81
Hoke Inc.	163
Uehling Instrument Co.	364
Worthington Corp. Mason-Neilan, Div.	545
Bailey Meter Company	610
Minneapolis-Honeywell Regulator Company	635
Wallace & Tiernan, Inc.	686
Pall Corporation	812
Chemiquip Company	854
McGraw-Edison Co., Thomas A. Edison Industries, Instrument Div.	908
Cameron Iron Works, Inc. Pressure Control Equipment Div.	997
Hastings-Raydist, Inc.	1020
American-Standard Controls Division	1068
Gulton Industries West Instrument Corp., Subs.	1226-28
H. O. Trerice Co.	1287
Dynametrics Corp.	1311
James F. Scanlon	1440

Temperature-measurement Devices

Burling Instrument Co., Inc.	9
Leeds & Northrup Co.	50
Taylor Instrument Companies	104
McGraw-Edison Co., Thomas A. Edison Industries, Instrument Div.	908

"He knows how it bends; sell him on the economy features."

Name of Exhibitor	*Booth No.*
Brooks Instrument Company Inc.	998
Hallikainen Instruments	1186
Gulton Industries West Instrument Corp., Subs.	1226-28
The Scam Instrument Corp.	1232
Herman H. Sticht Co., Inc.	1280
H. O. Trerice Co.	1287
Robertshaw-Fulton Controls Co. Fulton Sylphon Div.	1293

Viscosity & Density Meters

Brabender Instruments, Inc.	340
Schueler & Company Schuco Scientific Div.	345
Brinkmann Instruments, Inc.	360
Precision Scientific Co.	370-372
Scientific Development Co. Distillation Equipment	382
Photovolt Corp.	389
Brabender Corporation	390
Analytical Measurements, Inc.	395
Norcross Corporation	443
Brookfield Engineering Laboratories, Inc.	885-887
Union Industrial Equipment Corp.	1076
Hallikainen Instruments	1186
Industrial Nucleonics Corp.	1374-76-78
Waters Associates	1425

SAFETY

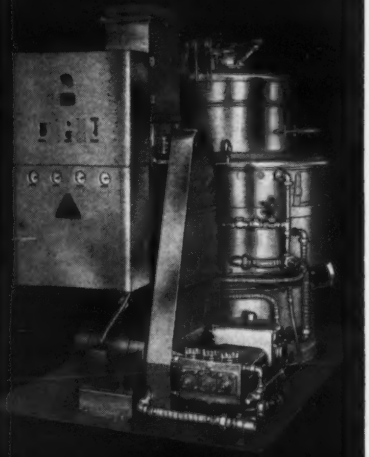
Safety Devices (Equipment)

I-T-E Circuit Breaker Company	64
Ansul Chemical Company	95
Falls Industries, Inc.	131
Mine Safety Appliances Co.	158
Black, Sivalls & Bryson, Inc.	685
The Carbone Corporation Chemical Equipment Div.	803
Chemiquip Company	854
Logan Emergency Showers, Inc.	883
Magnetrol Inc.	910-912
Jerguson Gage & Valve Co.	989
LKB Instruments, Inc.	1116
The Bastian-Blessing Company Rego Division	1122
The Nalge Co., Inc., American Vulcathene, Div.	1201
The Scam Instrument Corp.	1232
The Protectoseal Company	1286
Morland Associates	1383
Fike Metal Products Corp.	1386
Pressure Products Company	1409
Oxy-Catalyst, Inc. Industrial Department	1413

Safety Devices (Personnel)

Kewaunee Mfg. Co.	398
Ampco Metal, Inc.	412
Strahman Valves, Inc.	815
Miller Products Company, Inc.	1092
LKB Instruments, Inc.	1116

FOR STEAM AT PRESSURES TO 900 PSI ...OR HIGHER!



VAPOR
MODULĀTIC
WATER TUBE BOILER

CHECK THESE ADVANTAGES:

FITS ANYWHERE. Compact design takes only 40 sq. ft. of floor space . . . can be installed in unused corners, aisles, balconies, on roofs.

LOW INSTALLATION COST. Delivered completely wired and assembled on its own base plate. Fits through average plant doors . . . no wall removal necessary. Needs no special foundations or stacks.

LOW OPERATING COSTS. Fully automatic push-button operation. Modulating controls follow steam demand, produce steam only as needed, don't waste fuel. Burns oil, gas, or both fuels.

IDEAL FOR MULTIPLE UNIT INSTALLATION. For widely-varying steam requirements, two or more Modulātics can be operated with a single modulating control. Units are cut into the line as required, automatically shut down as steam demand slackens.

CONFORMS TO ASME and other codes.

WIDE RANGE OF SIZES. 18 to 150 hp. Pressures to 900 psi or higher. (Lower pressures also available.)

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28th Exposition of Chem. Indus.
Coliseum, New York
November 27—December 1

VAPOR CORPORATION

80 East Jackson Boulevard
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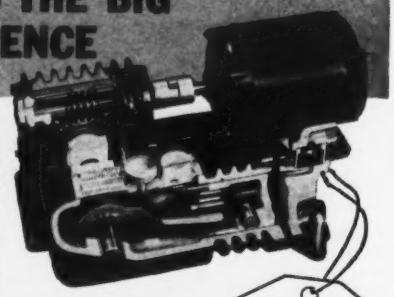
Check 1589 opposite last page.

UNITIZED CONSTRUCTION MAKES THE BIG DIFFERENCE



Unitized construction means it's completely enclosed, locked in permanent alignment, sealed against leakage, dirt and weather. All moving parts inside run in oil. Heavy duty design includes machine cut gears, outboard bearings on pump drive shaft. Solution heads of special materials available for slurries, corrosive liquids. Four standard sizes, up to 54 GPH, pressures to 300 psi. Duplex units double the capacity with one motor.

in the new **MADDEN** *Metriflow* **METERING PUMP**

Write for complete information on the new Madden METRIFLOW Metering Pump

MADDEN

THE MADDEN CORPORATION
1345 Jarvis Ave., Chicago 26, Ill.

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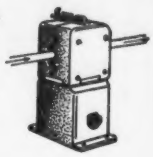
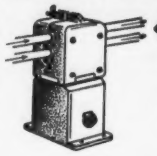
PUMPING IDEAS

POSSIBLE ONLY with a SIGMAMOTOR PUMP

MOVE CORROSIVE LIQUIDS

Material being pumped never comes in contact with pump mechanism. Wave-like motion of steel fingers forces material through Tygon tubing. By changing size of tubing, capacity can be increased or decreased. Pump housing opens for removal and insertion of tubing.



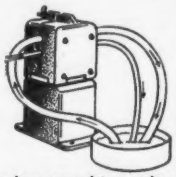


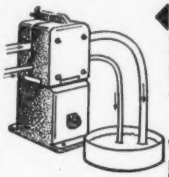
PUMP 2 OR 3 DIFFERENT LIQUIDS SIMULTANEOUSLY

Some models will accommodate up to four tubes so that four different liquids can be passed through the pump at one time without danger of contamination.

FEED AND MIX

One or more tubes can be feeding material to a mix while a larger tube is recirculating the liquid to produce agitation and thorough mixing. Viscous materials can be pumped without danger of gumming or plugging. Remove tube and pump is clean.





METER ADDITIVES

One or more additives can be pumped to a solution in the exact amount desired by selecting the correct size of tubing and regulating pump speed. Various controls can be incorporated to close valves ahead of pump.

Capacities from 0.5 cc. per min. to 4.5 G.P.M.

Write for complete information on sizes and capacities.

SIGMAMOTOR, INC.
18 N. Main Street • Middleport, N. Y

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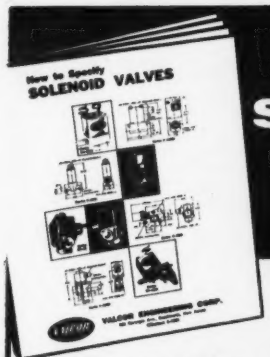
FREE SOLENOID VALVE DATA! ...from Valcor



"HOW TO SPECIFY SOLENOID VALVES", an 8-page brochure complete with drawings, diagrams, charts and curves . . . and "SOLENOID VALVE SELECTIONS FOR CORROSIVE APPLICATIONS", a 16-page manual listing over 500 corrosive media. Both are free. Both should be at your fingertips.

Write today for your copies!

VALCOR SOLENOID VALVES

VALCOR ENGINEERING CORP.

Booth 1283 CHEM. SHOW

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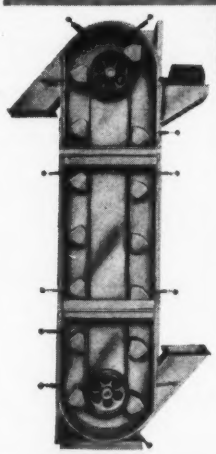
Check 1592 opposite last page.

buck-el CONVEYOR ELEVATOR

SANITARY



A Centrifugal Discharge Conveyor Elevator that you can clean simply and thoroughly — change from one product to another without contamination.

Casing covers, pulleys, belting completely removable — without disturbing operating machinery.

- Sanitary construction top to bottom
- Featuring small capacities and low headroom
- Stainless or Carbon Steel

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NEW IDEAS **for elevating and feeding bulk materials**
standard designs adapted to your requirements

write or telephone **buck-el CONVEYOR ELEVATOR**

The Bucket Elevator Co.
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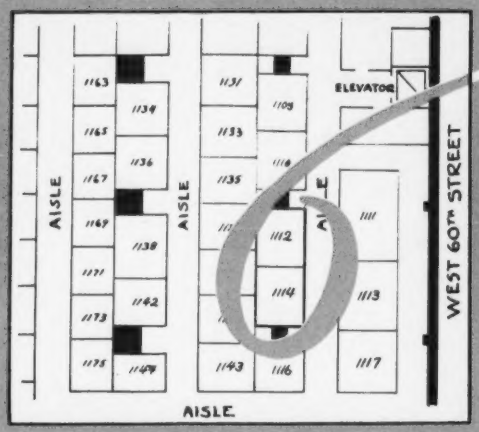
Check 1593 opposite last page.

Check 1594 opposite last page.

See "NATIONAL" *at the* CHEM SHOW



BOOTH 1112-1114
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Meet the Men WHO HAVE HELPED TO DEVELOP "NATIONAL" DRYING MACHINERY AND EQUIPMENT TO THE HIGHEST STANDARDS OF EFFICIENCY AND PRODUCTIVITY.

Bring Your DRYING PROBLEMS *With You!*

THE NATIONAL DRYING MACHINERY CO.
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Representatives in Boston, Spartanburg, Los Angeles and Foreign Countries
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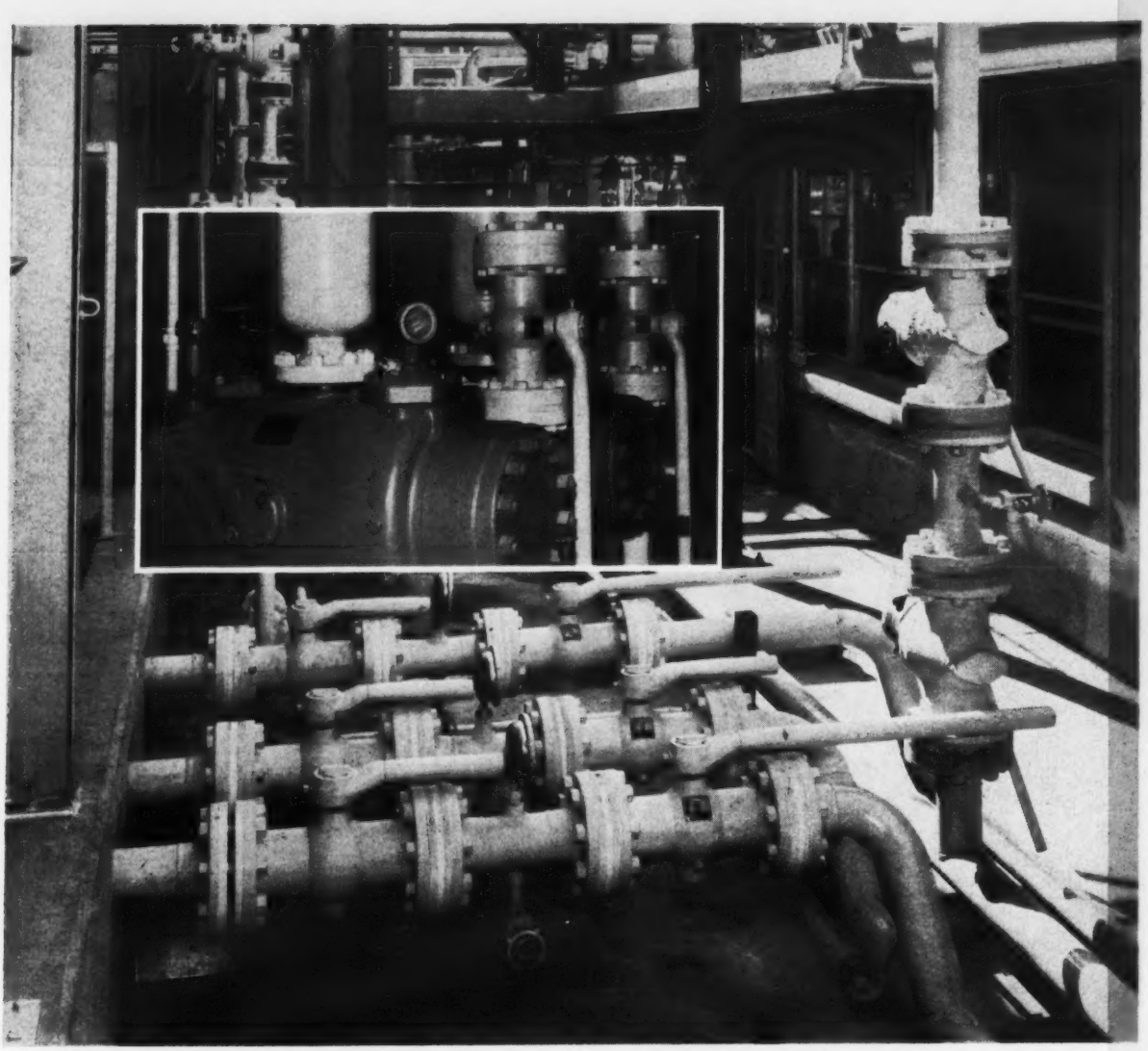
FORTY-FIRST YEAR—INSTALLATIONS AROUND THE WORLD



TAILORED TO FIT YOUR NEEDS

Cameron Ball Valves can be made of materials best suited to your needs, whether your problem is the handling of acids, alkalies or abrasives. Cameron's unique method of fabrication permits the use of exotic materials.

Lack of lubrication prevents product contamination. Teflon bushings, suitable for most applications, eliminate friction in valve operation. A tight shut-off for a long, long time is assured by a slight rotation of the seats with each valve operation. "Sealed for life" construction eliminates maintenance expense.

Cameron can make prompt delivery of Ball Valves from 2" to 42" (and larger if desired) in ratings of 150 lb. ASA to 1500 lb. ASA in any end preparation desired and of material to suit your needs. Let the Cameron representative furnish you details.

Cameron

CAMERON IRON WORKS, INC.
P. O. BOX 1212 HOUSTON, TEXAS

"See our exhibit at the Chem Show"

Check 1595 opposite last page.

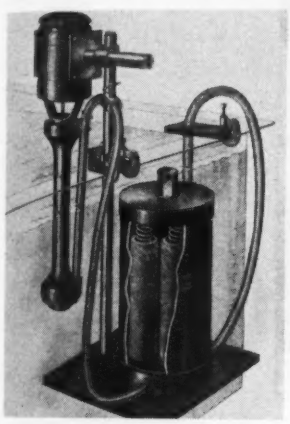
CHEM SHOW highlight

Packaged filter system fits on side of tank, handles 2700 gph

Uses: Filtering and circulating solutions at flow rates from 50 to 2700 gph.

Features: Packaged system comes complete with pump and filter. Sump-type pump is fabricated of high-temperature epoxy with type-316 stainless steel shaft. Units are easily mounted on vessel containing liquid being processed.

Description: Submerged in-tank filter systems are available in four sizes — the unit shown in the accompanying photo has capacity of 400-600 gph. Pumps are powered by ½, ¾ and 1 hp motors.

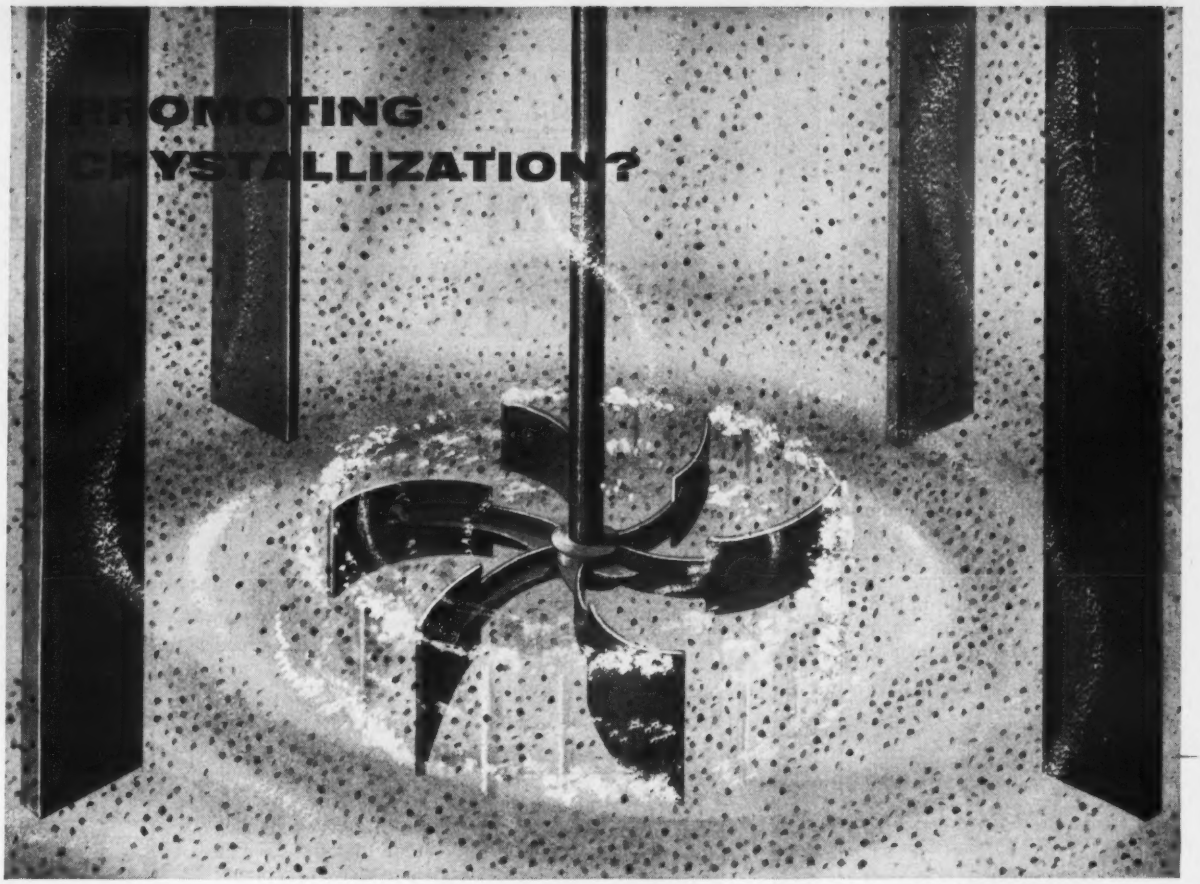


Compact in-tank filter system can be easily positioned in any convenient location on outside of tank

Filter chamber contains tubes made of cotton or dynel wound around stainless steel, polypropylene, PVC, porous stone or other corrosion-resistant core. Stainless steel brackets are used to fasten filter chamber to the tank. Depth adjustment device permits pump suction from any level in tank.

(Model UAA-400 in-tank filter system is product of Sethco Manufacturing Corporation, 2284 Babylon Turnpike, Merrick, L. I., New York.)

Check 1716 opposite last page.



ASK PHILADELPHIA!

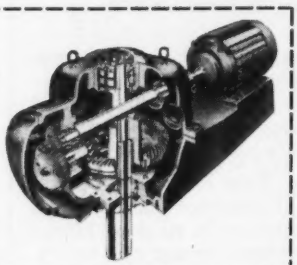
In a process where crystals must be deposited from solution, careful mixer design counts. Power input should be treated sparingly to prevent crystal breakdown from high shear effects, and a precise knowledge of flow patterns—and how to provide them—is necessary for proper heat removal.

Want an expert opinion? Ask Philadelphia. Philadelphia engineers have the know-how to smooth your way—can tell you when anti-swirl baffling provides the best flow pattern, or help you match impellers to the job for optimum efficiency. When *you* have a mixing problem, ask Philadelphia . . . and be sure.

Good General Rule: When promoting crystallization, use an impeller with high pumping efficiency . . . and provide the least practical flow.

Best General Rule: Ask Philadelphia about mixers *and* mixing. Philadelphia Mixers do what they're sold to do. Philadelphia Mixers *mix*.

HERE'S THE SECRET of trouble-free mixing: gears precision-ground to master gear perfection. Tougher, quieter, more powerful—the best mixer drives made are made by Philadelphia.



Get Facts—and plenty of them—on mixer design, construction, and specifications. Sections on *Fluid Mixing Practice* and *Process Mixing Technology* detail steps you can take to increase process efficiency. Read how to change gears in minutes for speeds from 20 to 280 RPM. Request 64-page Catalog A-19 on your letterhead today.

PHILADELPHIA MIXER

DIVISION OF PHILADELPHIA GEAR CORPORATION

King of Prussia (Suburban Philadelphia), Pennsylvania

ASK ANY ENGINEER / GEARS ARE THE HEART OF A MIXER

AGMA MEMBER

See us at the Chem Show in Booth #123

Check 1717 opposite last page.

CHEM SHOW highlight

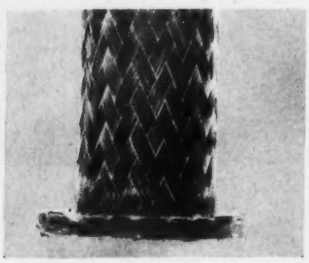
Braided-tube filter operates on old Chinese principle

Uses: Filters are designed for liquid clarification or polishing applications.

Features: Pressure-tube filter does not have to be opened to be cleaned. No scraping or spray nozzles are needed.

Description: Heart of filter are braided tubes made from stainless steel, monel metal, or any plastic that can be produced in a filament form.

When pressure is applied, tube elongates and shrinks in diameter, causing openings to contract and trap particles.



Tubes may be braided of metal or plastic filaments

When pressure is removed, tube returns to original dimensions. Each individual strand moves independently and quickly clears itself of cake.

(Flex-Tube filters are a product of Filtomor Incorporated, 460 Bloomfield Avenue, Montclair, New Jersey.)

Check 1718 opposite last page.

Engineering data for portable mixers is offered in 12-page bulletin. Selection table simplifies task of choosing correct unit for a specific job. Bul 194 — The Cleveland Mixer Company.

Check 1719 opposite last page.

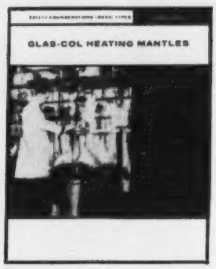
Indirect-fired, finned-tube heaters are subject of eight-page bulletin. Units produce up to 1200°F with capacities of five million Btu per hour and pressures to 300 psi. Bul 400 — Brown Fintube Company.

Check 1720 opposite last page.

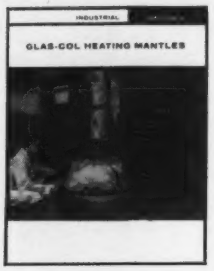
Just published by Glas-Col

Complete new guide to electric heating mantles

Written for laboratory directors, plant managers, design engineers, safety directors...*in 4 separate sections*

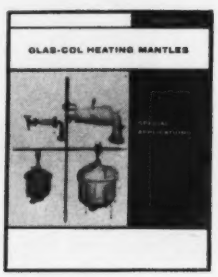


Section 1 Basic types of heating mantles . . . safety considerations . . . how *not* to use heating mantles.



Section 3 Industrial-scale mantles for glass-lined steel vessels . . . heating chamber blankets . . . drum heaters . . . pipe line heating tapes.

Section 2 Laboratory mantles made of glass fabrics for safe operation to 450°C and quartz fabrics (650°C) for flasks, beakers, funnels, vacuum vessels, evaporating dishes, bottles and jars . . . heating tops . . . mantles for columns and for Soxhlet, Kjeldahl and micro flasks . . . heating tapes and cords . . . electrical controls . . . mantle supports.



Section 4 "Custom" mantles for special applications.

Glas-Col Apparatus Company

Dept. CP, 711 Hulman Street, Terre Haute, Indiana

World's largest manufacturer of heating mantles for laboratory, pilot plant and chemical process heating applications.

Use this coupon to request sections you want . . . all four if you desire!

GLAS-COL APPARATUS COMPANY
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Terre Haute, Indiana

Please send

- ☐ Section 1—Introduction to Heating Mantles
- ☐ Section 2—Laboratory-type Heating Mantles
- ☐ Section 3—Industrial-scale Heating Mantles
- ☐ Section 4—Mantles for Special Applications

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Trademark Reg. U.S. Pat. Office. U.S. Patents 2,231,506; 2,282,078; 2,739,220; 2,739,221

Glas-Col makes the world's most complete line of electric heating mantles

– for laboratories

– for pilot plants

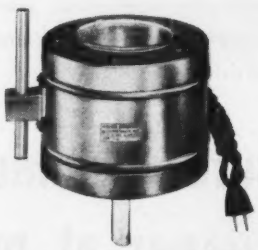
– for industrial chemical processing

Since their introduction in 1939, Glas-Col Electric Heating Mantles have become recognized as standard equipment for heating and distillation of flammable chemicals. Nearly half-a-million have been built—and *not a single fire has ever been reported from their use!*

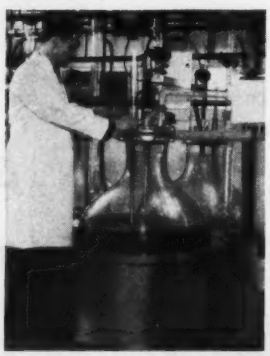
Heating mantle applications now extend beyond the laboratory into . . . plant-scale production of pharmaceuticals • production of very high purity chemicals in all-glass equipment up to 200-liter capacity • zoned heating of glass-lined steel kettles • atomic research • pipe line heating.

Glas-Col heating mantles can be applied to virtually any chemical heating apparatus, including special, highly complex equipment. All requests handled in complete confidence.

Spherical Mantle for a Two-Neck Flask

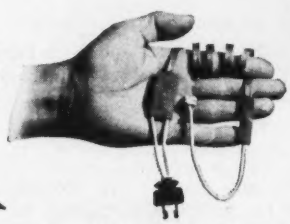


Mantle for fritted disc Buchner funnel



Glas-Col heating mantle for giant 200-liter flasks in all-glass pharmaceutical plant

Series S Quartz-Fabric Electric Heating Mantle



Laboratory-type Double-Element Heating Tape

Glas-Col electric heating mantle specially designed for 150-gal glass-lined steel kettle

Glas-Col Apparatus Company

GLAS-COL APPARATUS COMPANY
Dept. CP, 711 Hulman Street,
Terre Haute, Indiana

Trademark Reg. U.S. Pat. Office. U.S. Patents 2,231,506; 2,282,078; 2,739,220; 2,739,221

Check 1721 opposite last page.

High efficiency, safety features of direct-fired heat exchanger

Uses: Providing heat for various processes in chemical and allied industries.

Features: Heater is compact and has direct-fired fuel reactor that can produce temperatures to 3000°F in minutes.

Description: Skid-mounted, tubular heat exchanger uses high-velocity inert gas discharge as heating medium. Flame is contained within reactor with release rates up to 10 million Btu/hr/cu ft of combustion volume.

Because there is no flame extension, there are no expensive refractory linings necessary. Tube walls are only about one foot apart.

Rapid mixing and recirculation around tubes is obtained by jet pump effect of discharging high-velocity jets of flue gas into muffles. Hot gases quickly drop in temperature by mixing with the inspirated cooler gases from the rear of the tubes. Heat transfer is between 80 and 90% convective and 10 to 20% radiant.

Burner is ignited by internal electric spark. Fire and explosion hazards are minimized due to the inert nature of the exhaust gases. Oxygen content is only 0.1%.

(Uniflux heat exchanger is product of Black, Sivalls & Bryson, Inc., 7500 East Twelfth Street, Kansas City 26, Mo.)

Check 1722 opposite last page.

NEXT MONTH

The Zimmermann wet combustion process now operating in a Norwegian paper mill is providing an effective answer to the old problem of what to do with waste sulfite liquors. Handling 650 gpm, two reactors are supplying the mill with about 50% of its steam needs — in addition to salvaging 40,000 tons of valuable by-product gypsum per year. The process burns the liquor, without flame, in the presence of water, after the liquor has first been used for alcohol production. Don't miss this interesting article in the November issue.

Four Metal Missives of G-B's Fine Design

No, these four shiny tubes are not miniature rockets, subs, or secret weapons. But they were given the letter of fine design and skilled manufacture that must go into any GOSLIN-BIRMINGHAM product.

Actually, these are exchangers for acetic acid distillation. Theirs is the job of condensing acetic vapors and cooling the resultant liquid.

The units from left to right are: (1) a 26" dia., acid recovery cooler; (2) a 32½" dia., acetic flashing column condenser; (3) and (4) 40½" dia., acid recovery sub-coolers.

All four units are of stainless steel throughout, with 1" OD tubes and fixed tubesheets welded inside of shells.

Write or call for information. See our catalog in Chemical Engineering Catalog.

GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
P. O. BOX 631 BIRMINGHAM, ALABAMA
FILTERS • EVAPORATORS • PROCESS EQUIPMENT • CONTRACT MANUFACTURING including HEAVY CASTINGS

Check 1723 opposite last page.

Combination of control instruments, valves and other supporting equipment assures accurate and economical operation of paper-machine drying sections at West Virginia Pulp and Paper Company

Achieving 100% recovery of condensate, automatically controlled, packaged steam-distribution and drainage system on Fourdrinier . . .

Assures optimum drying of paper at minimum cost

TED F. MEINHOLD, Associate Editor
with **GENE J. SEMAR,** Assistant to Paper Mill Superintendent
West Virginia Pulp and Paper Company
Luke, Maryland

ASK any paper mill expert and he will agree that it is expensive to dry paper. The final price of the end product is determined to a large extent by the cost of the mill's drying operation. If this step is not performed efficiently and effectively, manufacturing costs quickly rise.

A NEW SOLUTIONS FEATURE

West Virginia Pulp and Paper Company, which is nearing completion of a $50-million expansion program at its huge Luke, Maryland, mill, maintains peak production and keeps drying costs at a minimum by assuring that it gets maximum heat utilization from steam passing through the drying sections of its giant paper machines.

Of primary importance, in this respect, is accurate steam control coupled with fast, continuous and complete removal of condensate and non-condensable gases from the dryer cylinders. To achieve this, each paper machine is equipped

with its own steam distribution and condensate-drainage set-up. All necessary control instruments, valves, steam separators, receivers, flash tanks, condensers and pumps are included in the "packaged" system, which was furnished as a complete unit by the manufacturer.

An Example: No. 5 Machine

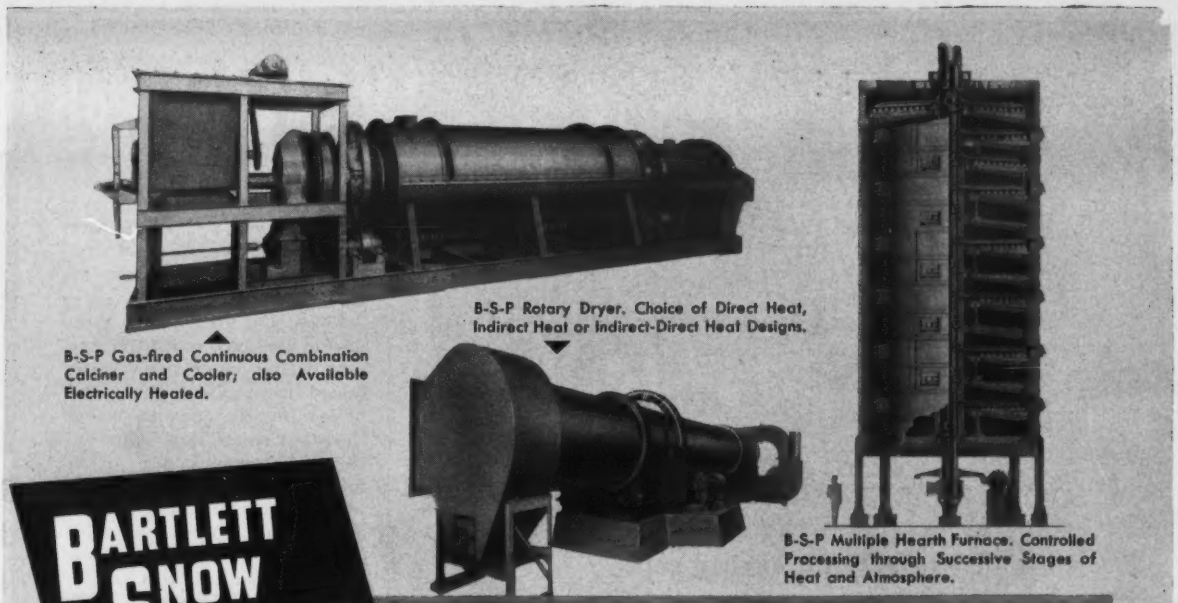
One of the more recent paper machines in the mill to be so equipped was Fourdrinier No. 5, which produces fine paper for offset and letterpress printing applications. The machine, about 250′ long and 140″ wide, turns out more than 200,000 lb of paper per day at speeds up to 1000 fpm.

Steam at 30 psi is supplied to the unit's three drying sections through five steam headers. There are a total of 50 drying rolls, each measuring 48″ diam by 136″ wide. Total steam consumption is approximately 25,000 lb per hour.

The rolls receive the steam through hollow-drive side journals. As heat passes from the rolls onto the rapidly moving web of paper, the steam in the rolls condenses. The condensate, along with a quantity of live steam and entrained air or other gases, leaves through outlet syphons to a condensate header.

From the header, the condensate goes into a divided receiver, which has both an upper and a lower outlet. Steam and entrained gases pass from the upper outlet into a steam header and are distributed to other drying sections, which operate at lower pressures.

The condensate drops through the lower outlet to another receiver from where it is pumped back to the power plant. Condensate is maintained at constant level by controls and valves in the receiver. The mixture of steam and gases finally leaving the drying sections goes to vacuum condensers where steam is condensed at about 150°F and entrained gases are removed by vacuum pumps. Gas-free condensate is returned to the

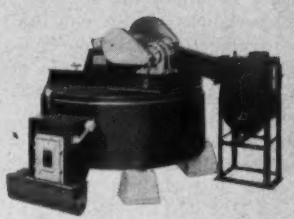

B-S-P Gas-fired Continuous Combination Calciner and Cooler; also Available Electrically Heated.
B-S-P Rotary Dryer. Choice of Direct Heat, Indirect Heat or Indirect-Direct Heat Designs.
B-S-P Multiple Hearth Furnace. Controlled Processing through Successive Stages of Heat and Atmosphere.

BARTLETT SNOW PACIFIC

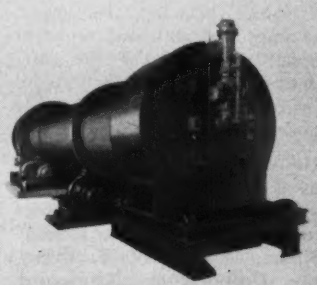
the ***first complete line*** *of*

HEAT PROCESSING EQUIPMENT

every size, every type, for every application



B-S-P Batch Dryer Showing Special Dust-tight Discharge to Screw Conveyor.



B-S-P Continuous Rotary Kiln; Temperatures to 3,000°F; also Batch Kilns.

It's new! You've never had this service before! Now, through the consolidation of **Bartlett-Snow,** internationally known builders of rotary dryers, coolers, calciners and kilns; and **Pacific Foundry and Metallurgy,** world's leading builder of multiple-hearth furnaces; **Bartlett-Snow-Pacific** can supply **all** your heat processing requirements.

Only **B-S-P** can offer unprejudiced recommendations by expert engineers who are not restricted by narrow product lines or limited plant facilities. Specialized research laboratories are available to develop any additional chemical and physical data needed. Complete material handling facilities can be designed and built to insure operation of the entire system as an efficient, coordinated, profit-making unit. Be sure to get a **B-S-P** recommendation on your next new construction or modernization project.

B-S-P
ENGINEERED EQUIPMENT

Bulletin No. 118-R will give you all needed information. We would be pleased to send you a copy.

Process Engineering Division, Dept. B-111

BARTLETT-SNOW-PACIFIC, INC.

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Cleveland 5, Ohio

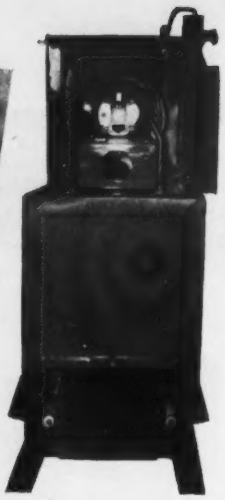
3100—19th Street
San Francisco 10, Calif.

1270 Avenue of the Americas
New York 20, New York

DRYERS • COOLERS • CALCINERS • KILNS • MULTIPLE HEARTH FURNACES

"See our exhibit at the Chem Show"
Check 1724 opposite last page.

Announcing The NEW JETZONE® PARTICLE OVEN



The creation and development of this new JETZONE particle oven revolutionizes the techniques of drying particles. Wolverine offers a new method for the heating and cooling or drying of particulate material; such as, chopped plastic, pelletized rubber, food, and chemicals

This method embodies an air projection assembly which shoots high velocity air (hot, cool or dry) into the bed of material causing it to be completely aerated. All particles are in motion, but they are in regular contact with the conveyor in the fluidized state. This technique is a vast improvement over contemporary equipment and the JETZONE process reduces the treating times from 1/3 to 1/6 of conventional methods.

The advantages are many:

1. Moving particles process faster . . . more surface is exposed and treatment is greatly accelerated by the high velocity of the treating air or gas. Two to six times faster than conventional methods.
2. Time of treatment is under *control.* It can be set for each particle because of the uniform flow. No over cooking or burning of "lost" particles. "Holes in the bed" do not disturb function. Treatment is gentle, even delicate pellets remain intact.
3. Zoning is standard inasmuch as the ovens are by design sectional. On wet and/or delicate products full advantage can be taken of high temperatures in the initial zones.
4. A clean process — the material rests on a smooth stainless surface (no perforations or screens). Fines if present can be completely removed and collected. Because of special design, clean-up is in minutes for a change of products.
5. Equipment is compact. Where space is valuable a JETZONE unit will provide more production per cubic foot of plant.
6. Simplicity of design cuts manufacturing costs.

To prove our point, demonstrations are FREE OF CHARGE. Write us today concerning demonstrations, pilot runs and design runs.

"TAKING THE MYSTERY OUT OF DRYING"
WOLVERINE
JETZONE LABORATORY DIV.

A LEADER IN HIGH VELOCITY DRYING SINCE 1946
WOLVERINE EQUIPMENT COMPANY
745 CONCORD AVE., CAMBRIDGE 38, MASS.

Check 1725 opposite last page.

power house for reuse.

There are two vacuum condensers in the system — one serving each end of the paper machine. The "wet-end" unit handles about 80% of the total condensate, while the "dry-end" condenser accounts for the remaining 20%.

In passing through the three drying sections, moisture content of the paper sheet is reduced from about 65% (wet basis) to the desired level. Constant steam flow and condensate removal are maintained by creating and controlling pressure drops across each section. Differential pressure instruments and control valves accomplish this job.

Sectional differential valves operating sequentially with steam makeup valves, permit rapid clearing of non-condensibles during machine startups and also relieve excess steam during radiation loads.

Experience has shown that the drying and drainage system helps insure the output of top-quality paper at maximum production rates and economy. Proper steam control in the drying sections minimizes wet streaks and curling of paper edges. Dry-end breaks are also reduced, cutting production losses and downtime.

Power costs are also lower. Prompt removal and reuse of essentially 100% of the condensate result in better steam utilization and less horsepower makeup.

(More information about packaged drying-and-drainage systems for paper machines may be obtained from Mason-Neilan Division of Worthington Corporation, Norwood, Massachusetts.)

Check 1726 opposite last page.

Reference manual-bibliography of 18 pages, lists 90 important articles about filtration, dust collecting, air pollution control, sieving, sifting, straining and air conditioning that have appeared recently in leading technical and trade publications. Dates of issue, page numbers and synopses of contents are shown. As far as is known, it is the only comprehensive work of its kind ever published in these fields. Reference manual — Snow Filtration Co.

Check 1727 opposite last page.

Sturtevant Equipment NEWS

Vertical air-swept impact mill with integral air classifier

Sturtevant Pulver-Mill® does in one step what used to take two

Designed for fine grinding into the micron range and precise end product classification — all in a single operation, Sturtevant Pulver-Mills are proving highly effective for pulverizing soft to medium hard non-metallic materials. ■ *In Ag chemicals,* Pulver-Mills have helped one blue chip company enter and compete profitably in the lucrative 95% 325 mesh market . . . *In the milling field,* too, Pulver-Mills are increasing yield while also improving uniformity of particle size . . . *And pilot runs* at Sturtevant's laboratory indicate that Pulver-Mills can lower production costs, improve quality control, in the pulverizing of dozens of other materials. ■ Air-swept principle of operation (special intake vane design "whirls" vertical air flow) enables both control of attritional heat and integral air classification of end product. Precise selection of desired particle size is accomplished by an adjustable selector bar system. Unique deflector wall design "bounces" any partially reduced material back into the Pulver-Mill grinding zone — makes the reduction process (revolving impactors passing between fixed wall impactors) fast, highly efficient. ■ Now available in three models with capacities ranging from several hundred pounds per hour to 7½ tons per hour, Sturtevant will welcome the opportunity to test-run any soft to medium hard non-metallic material you may be working with.

For further information, send for Sturtevant Bulletin No. 093. Write Sturtevant Mill Co., 119 Clayton St., Boston 22, Mass.

STURTEVANT 85 years of design leadership in Air Classifiers, Micron Grinders, Pulverizers, Blenders, Crushers, Grinders.

"See our exhibit at the Chem Show"
Check 1728 opposite last page.

CHEM SHOW highlight

Heat sensitives dried with steam, air, gas in fluid energy mill

Uses: Continuously drying heat-sensitives and other materials that heretofore required vacuum drying. Finished product can have fractional micron particle size if desired.

Features: Moisture may be reduced from as high as 65 down to zero percent. Dehydration is accomplished almost instantaneously.

Description: Jet-O-Drier is a fluid-energy type mill that achieves dehydration by using either heated air, gas or steam. Operating pressures are as low as one pound. Temperatures are up to 1000°F. Final moisture content and particle size can be controlled. Equipment is available in various sizes and in a wide range of materials of construction.

Among the materials being commercially processed with the device is titanium dioxide filter cake. Moisture content is reduced from 50-60 down to zero percent. Throughput rate is 1000 lb product per hour. Superheated steam at 150 psi is used as drying medium. Particle size of final product averages 0.5 micron.

(Jet-O-Drier fluid energy mills are product of Fluid Energy Processing and Equipment Co., Richmond and Norris Sts., Philadelphia 25, Pa.)

Check 1729 opposite last page.

"The acid tank is full of water . . ."

How SANDVIK Continuous Belt Coolers Make Drum Types Old-Fashioned

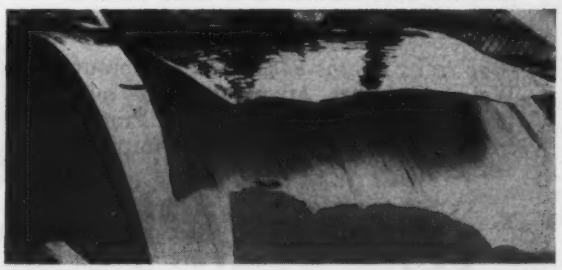
Schematic view shows how Sandvik Steel Belt Water Bed Cooler* operates. Solid steel band "floats" on water-bed tank of circulating water or other coolant. Coolant pressure assures 100% contact with bottom of belt.

*Patented

Sandvik also has portable, experimental cooling units on which you can make small scale trials in your own plant.

The SANDVIK patented water-bed, steel-belt cooler gives you these advantages:

- **UNLIMITED COOLING AREA**—Belts up to 48" wide—any length.
- **CONTROLLED ZONE COOLING**—Water-bed under belt can be sectionalized to permit zone by zone control of cooling (or heating) rate.
- **CONTROLLED FLAKE THICKNESS** — Made possible by flat, horizontal surface of belt. For thicker material, side skirts can be applied at the belt edges.
- **UNIFORM COOLING**—Assured by total contact of coolant with underside of belt.
- **CONVEY WHILE COOLING** — Facilitates processing efficiency. Material can be discharged directly into crusher.
- **EASY SEPARATION**—Most materials cooled on the horizontal belt surface separate readily when belt curves around pulley, even without scraper blades.



SS-240

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Check 1730 opposite last page.

SEE THE RESULTS AT THE CHEM SHOW

BOOTHS 846 - 848

you'll find valuable POINTERS FOR PROFITS for your processing requirements

- **from laboratory tests**
- **from case histories**
- **from nearly 400 samples**

PLUS fully qualified and experienced personnel to talk with you in terms of product improvement and more efficient production methods.

Stop in at Booths 846 - 848 . . . Sprout-Waldron's entire Adaptioneering® team invites you to see "Pointers For Profits" in live, realistic, profit-for-you form!

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MUNCY, PENNSYLVANIA
SINCE 1866
Size Reduction • Size Classification • Mixing & Blending
Bulk Materials Handling • Pelleting & Densifying
648

Check 1731 opposite last page.

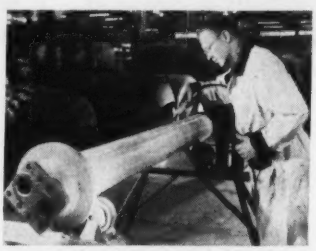
CHEM SHOW highlight

Ceramic-metal reactors withstand temperatures up to 1500°F

Chemical processing equipment lined with Nucerite — a recently developed form of crystalline glass (see CHEMICAL PROCESSING, October 1960, page 118) — has come of age. The manufacturer is accepting orders for reactors with capacities up to 2000 gal.)

Immersion-type heaters are being developed and should soon be available. Manhole extension collars for standard glass-lined reactors will also be produced.

Nucerite is actually a family of ceramic-metal composites. Its characteristics are a result of closely controlled nuclea-



Immersion-type heater coated with Nucerite being checked by factory inspector

tion and crystallization within certain ceramic formulations.

Product is capable of withstanding temperatures up to 1500°F, even where erosion, corrosion, abrasion and other difficult conditions are encountered.

(Further information about reactors fabricated from Nucerite SA-11 may be obtained from the Pfaudler Co., division of Pfaudler Permutit Inc., Rochester 3, N.Y.)

Check 1732 opposite last page.

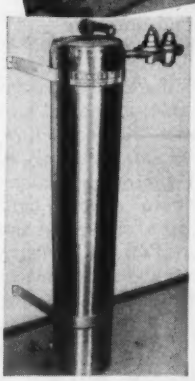
Line of horizontal vibratory screens and conveyors are described in eight-page bulletin. Special section discusses positive, self-adjusting eccentric drive. Bul B-100 — Comco Corporation.

Check 2074 opposite last page.

These ELGIN DEIONIZERS *cover every need for* MINERAL-FREE WATER

Whatever *quality* of water you require—even up to 18,000,000 ohm purity—there is an Elgin Deionizer that will deliver it. Whatever *quantity*—from smallest laboratory to largest needs—there are Elgin Deionizers like those illustrated below that will exactly fit your requirements. Write for bulletins.

Ultra-Deionizer automatically delivering water of highest quality in any amount. Ask for Bulletin 512A.



Multi-column Deionizer built in all anion and cation exchange combinations. Ask for Bulletin H4.

Small mixed bed deionizer with exchangeable refill that eliminates regeneration. Gives 120 GPH of water that is chemically purer than distilled water. Ask for Bulletin 513.

ELGIN SOFTENER CORPORATION
180 N. Grove Ave., Elgin, Illinois
Representatives in Principal Cities
In Canada: G. F. Sterne & Sons, Ltd., Brantford

Check 1733 opposite last page.

THE WORK OF THREE OR MORE PROCESS UNITS CAN NOW BE DONE WITH A SINGLE MIL REACTOR

A simple test in Patterson's pilot plant in the laboratory at East Liverpool, Ohio will convince you that this unit can save thousands of dollars on a single installation. It allows blending, dispersing, and wetting to be combined with reacting, drying, or grinding operations all in one unit. It is possible to gas-blanket, operate within precise temperature ranges, and in batches or continuous flow! One of Patterson's most valuable engineering contributions to the chemical processing industry is the amazing Mil Reactor.

TURN THE PAGE FOR MORE INFORMATION

Patterson Foundry & Machine Company

Gentlemen:

*Please arrange to contact us about a*_____

_____

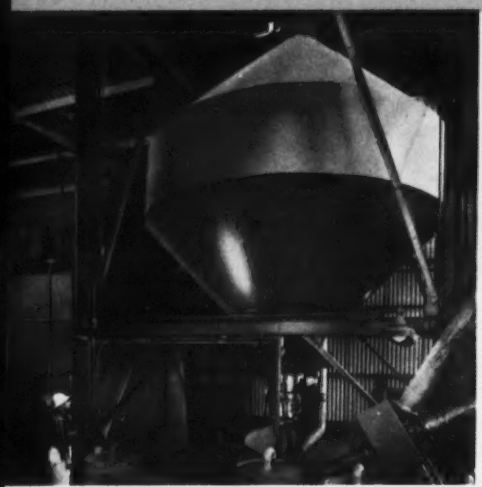
NAME_____

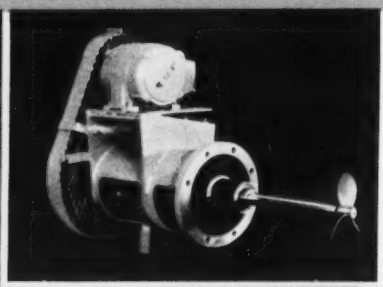
TITLE_____

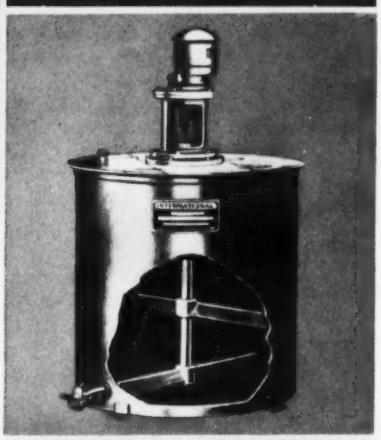
COMPANY_____

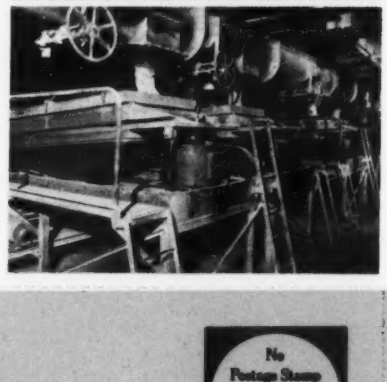
CITY_____ STATE_____

Current Production at Patterson FOUNDRY AND MACHINE COMPANY for Chemical processing









Supremely fast, uniform dry blending

The Thoro Blender

This widely accepted unit has produced peak performance year after year because the design is correctly engineered to produce super-rapid gentle mixing of almost every conceivable material. The unit quickly produces an intimate, thoroughly homogeneous blend of materials even where the most difficult variations in particle size and densities are encountered. Check the Thoro Blender brochure for complete details.

Important Progress being made for Petroleum Agitation In petroleum agitation devices, Patterson's new equipment promises to be second to none in wanted features, in quality and ability to do the job year after year with little or no maintenance problem. Talk with the man from Patterson about your agitation needs. He'll save you money!

GEAR DRIVEN SIDE ENTERING MIXERS Also a leading performer in its class, the geared unit delivers very large volumetric flows.

SIMPLIFIED SYSTEM FOR REPLACING SEAL OR PACKING This unique system permits replacing packing quickly and easily, even with the process vessel full of product. Two mechanical seal arrangements and the stuffing box design are interchangeable on any International Side Entering Agitator (Belt Driven or Geared) made after May 1960.

Vertical Mixer The basic unit is factory assembled for atmospheric pressure operation, and fitted with a hinged lid on the cover. Standard tanks are available in capacities from 45 to 2290 gallons.

Custom-made tanks of any design can be furnished — including jacketed for steam heating or water cooling, lined, wooden, dished bottom.

Maintain Precise Grinding Standards
"Gyro-Centric" Screens Patterson Gyro-Centric Screens have a broad range of applications: IN DRY SCREENING . . . sizing of such items as chemicals, food and dairy products, plastic powders, abrasives, adhesives, metal powders, soap powders, refractories — either separately or in conjunction with pulverizing equipment. IN WET SCREENING, sifting paint, ball powder, clay slip, liquid starch, ground minerals, pigments and many other products.

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Patterson Foundry & Machine Company

East Liverpool, Ohio

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to express our thanks . . . the first 100 will receive a fine ball point pen with a draftsman point!

Litho in U.S.A.

Drop-bottom doors assure fast emptying of mixer

Uses: Mixing various dry, granular materials in chemical and allied industries.

Features: Drop-bottom design permits unit to be emptied quickly and efficiently.

Description: Mixer is ribbon-type unit capable of heavy-duty use. Power requirements are as follows: One-ton mixer, 15 hp; two-ton unit, 20 hp. The foregoing are based on 35 lb per cu ft ingredients.

The drop-bottom doors can be opened and closed in matter of seconds. Doors are sealed in such a way that no leakage occurs during processing.

(Further information about H & S drop-bottom mixer may be obtained from Hayes & Stolz Industrial Manufacturing Co., P.O. Box 11217, 3521 Hemphill, Fort Worth 10, Tex.)

Check 1734 opposite last page.

Temperatures to 600°F provided promptly by electric units

Uses: Achieving rapid heating in small reactors, vessels or other units.

Features: Heaters are powered by electricity and can meet requirements up to 600°F. Special units are also available for temperatures exceeding 1100°F.

Description: Cartridge-style devices fit receptacle hole diameters from ⅜ to 1-5/16 inches. Heater length is up to 8½ inches. Units carry from 75 to 1000 watts.

Flexible nickel wire is used for terminals on heaters ¾" diameter or less. Brass or stainless steel posts are provided on larger sizes. Hermetic terminal seals and other adaptations are also available.

(Cartridge heaters are product of Heatrex, Inc., Meadville, Pa.)

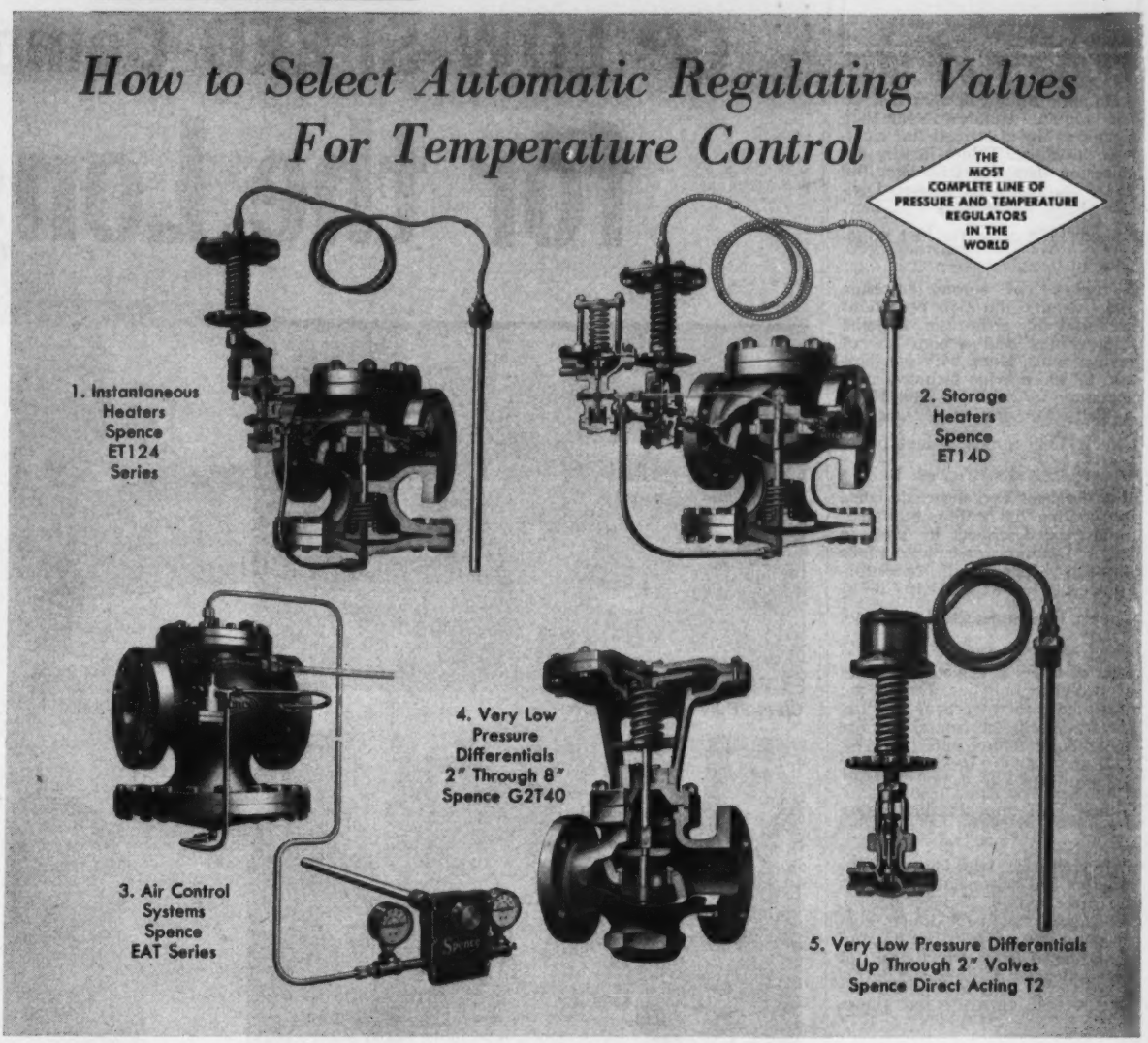
Check 1735 opposite last page.

For more information on product at left, specify 1736. . . . "See our exhibit at the Chem Show"

VALVE TIPS:

How to Select Automatic Regulating Valves For Temperature Control

THE MOST COMPLETE LINE OF PRESSURE AND TEMPERATURE REGULATORS IN THE WORLD


1. Instantaneous Heaters Spence ET124 Series
2. Storage Heaters Spence ET14D
3. Air Control Systems Spence EAT Series
4. Very Low Pressure Differentials 2" Through 8" Spence G2T40
5. Very Low Pressure Differentials Up Through 2" Valves Spence Direct Acting T2

During the past year, our field representatives have reported many cases of improperly, and uneconomically, applied temperature regulators. To help you avoid some of these costly mistakes, here are a few tips on selecting the most effective and economical temperature regulating valves for your applications.

1. Instantaneous heaters require a special action for close temperature control and freedom from hunting. In the Spence ET124 series, steam pressure is modulated according to temperature (demand) and is automatically regulated at any pressure established by the demand.
2. Storage heaters, on the other hand, are more economically controlled by the Spence ET14D, which includes a simple temperature-actuated pilot that opens and closes the main valve to maintain a constant temperature.
3. Air control systems can now have a ±5°F control accuracy under wide and instantaneous load swings with the Spence EAT regulator. Engineers report savings of up to 50% in installed costs with this recently developed Spence cascade system when it has been used in place of conventional instrumentation.
4. For the combination of very low pressure differentials and air or water control, Spence recommends Type G2T40. This single seated pilot operated valve provides fast, positive response in 2" through 8" valves. Double seat Type G22 is also available in 10" through 12".
5. When very low pressure differential is encountered with valves of 2" or less, the Spence direct operated T2 is recommended. The sensitive vapor tension thermostat responds quickly to small changes in bulb temperature for continuous, accurate control.

In this brief description of industrial process and heating temperature control, we have given a few important tips in proper regulator selection. If you would like more detailed information on these control applications, write for the new Spence Temperature Control Bulletin IV 1014. 8E-180

SPENCE ENGINEERING COMPANY, INC.
Walden 1, N. Y.
Paulsen Spence, P. E., President

Check 1737 opposite last page.

NEW LITERATURE

Processing Equipment

Automatic dust collectors that do not require shutdown for bag cleaning are described in eight-page brochure. Tables itemize engineering data for 25 units. Bul 164-6 — Northern Blower Division, Buell Engineering Co., Inc.

Check 1738 opposite last page.

Advantages of porous porcelain filters in fine filtration operations are told in eight-page bulletin. Photographs and schematics of various units, along with specification tables, provide technical data necessary for selection. Bul MF-1 — Selas Corporation of America.

Check 1739 opposite last page.

Roto-fin heat exchanger, designed for cooling or heating bulk materials, is described in six-page folder. Diagrams and photographs illustrate design and operation. Folder 2911 — Link-Belt Co.

Check 1740 opposite last page.

Line of filters is depicted in series of two-page bulletins. Details are presented for vertical-pressure, "Hydra-Shoc", horizontal-pressure and tubular filters. Buls 112, 114, 122, and 123 — Industrial Filter & Pump Mfg. Co.

Check 1741 opposite last page.

Pulverizers for semi-fine and fine grinding and non-metallic minerals are presented in 32-page catalog. Basic information on design, construction and performance of complete line of units is included. Cat 64 — Bradley Pulverizer Co.

Check 1742 opposite last page.

Dust filter that has only three moving parts is depicted and described in eight-page bulletin. Photographs of actual installations are shown. Dimensions and specifications are given for single and multiple units. Bul G-331 — The Day Company.

Check 1743 opposite last page.

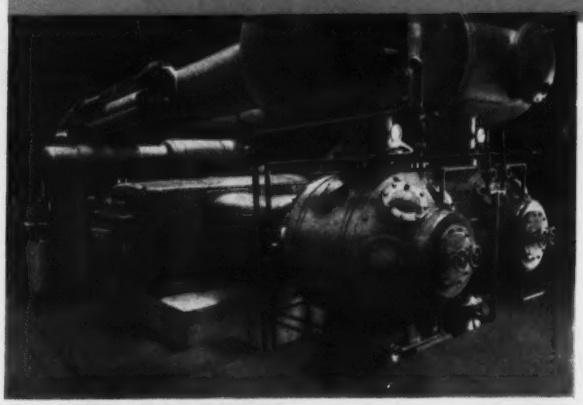
Air pollution control equipment is subject of illustrated, 12-page brochure. Manufacturer's production, testing and service facilities are also described. Bul 500 — Research-Cottrell, Inc.

Check 1744 opposite last page.

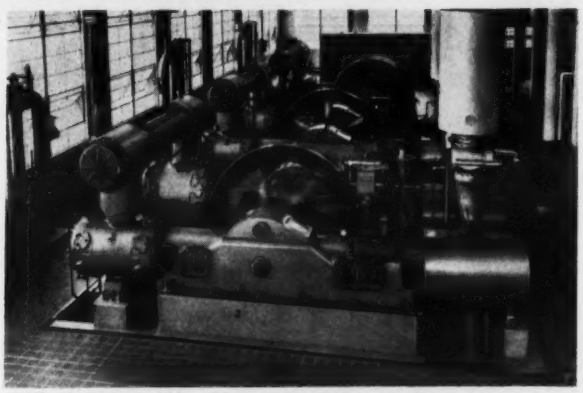
Self-cleaning, magnetic separator for removing tramp iron and other ferrous contamination is described in four-page bulletin. Photographs and drawings explain operation and features. Bul 1206-B — Dings Magnetic Separator Company.

Check 1745 opposite last page.

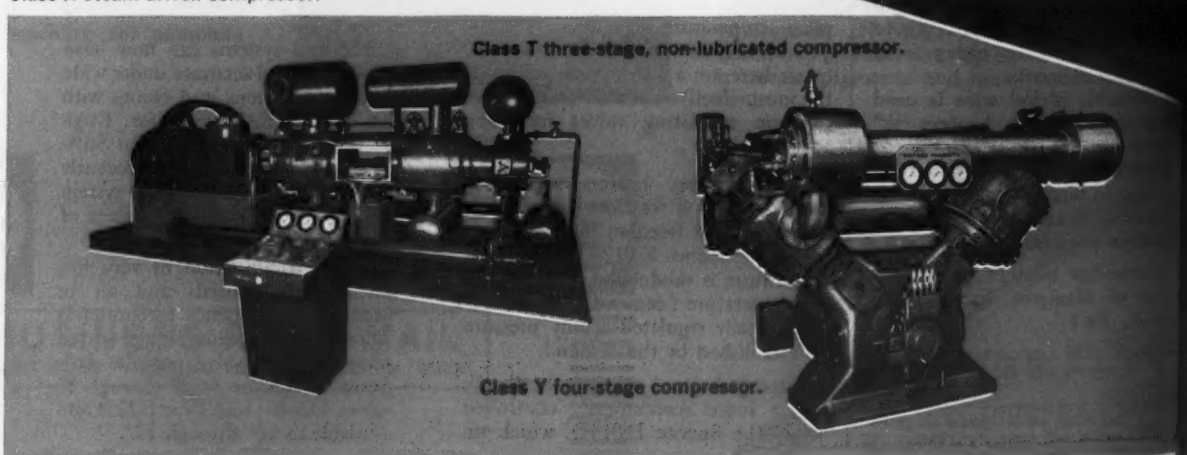
CP LOW SPEED Compressors for the Long Haul



Class FE five-stage compressor.



Class H steam-driven compressor.

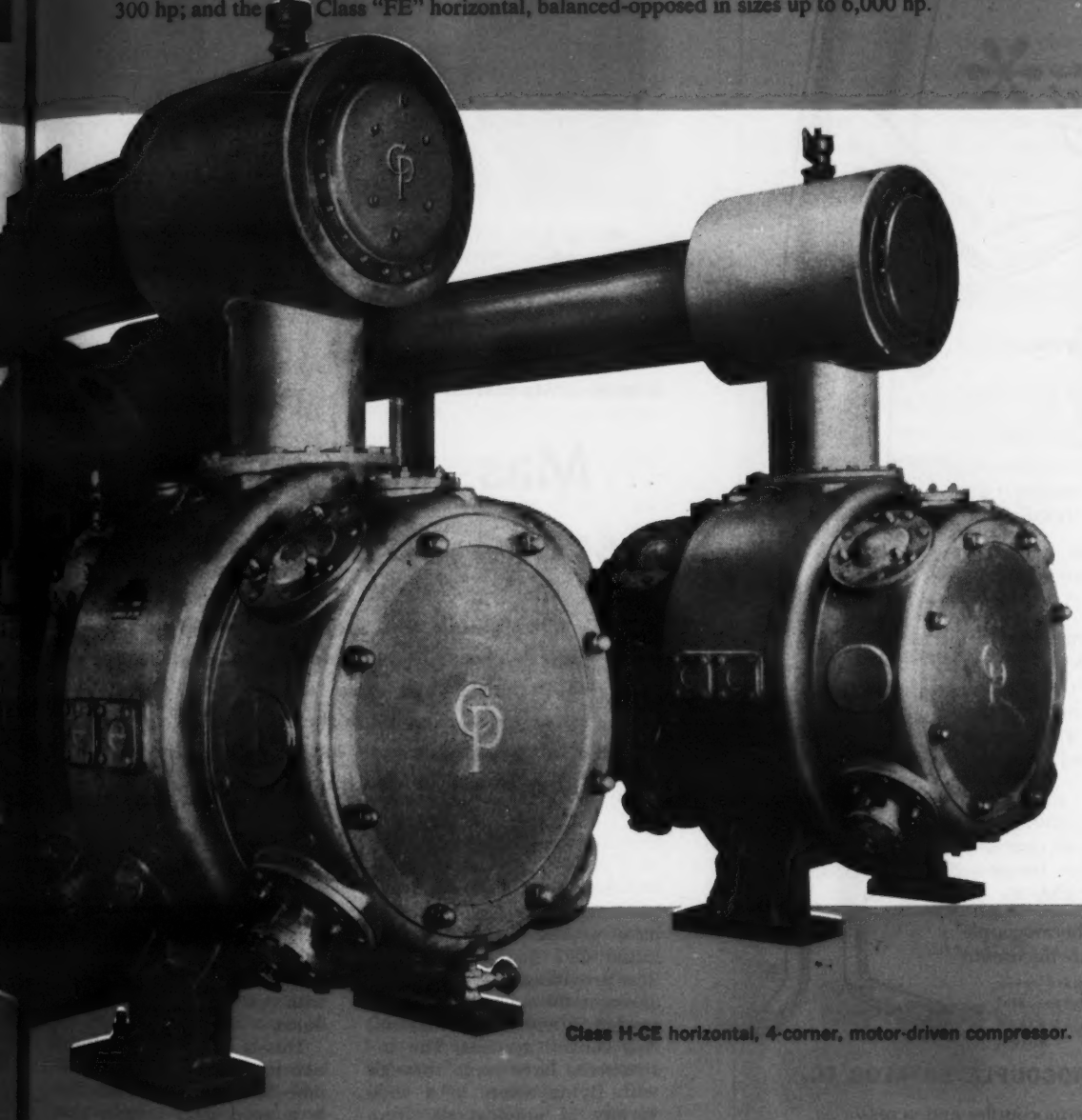


Class T three-stage, non-lubricated compressor.

Class Y four-stage compressor.

CP's wide variety of compressors include the low speed horizontal duplex, and "four-corner" designs. Simple, sturdy, conservatively rated, they have distinguished themselves for their high efficiency, dependability, low maintenance cost, long life. Available in sizes up to 2,000 horsepower; from one to six stages for pressures up to 15,000 pounds; motor- or steam-driven.

CP also offers a wide choice of other types, tailored to meet specific requirements. They include the Class "T" horizontal, straight-line in sizes to 150 hp; the Class "Y" up to 300 hp; and the Class "FE" horizontal, balanced-opposed in sizes up to 6,000 hp.



Class H-CE horizontal, 4-corner, motor-driven compressor.

Chicago Pneumatic

8 East 44th Street, New York 17, N. Y.

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC AND ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS

Check 1746 opposite last page.

Thickeners for chemical, metallurgical and industrial processing are pictured and described in 24-page brochure. Single- and multiple-compartment units having both center- and perimeter-drive rakes are reviewed. Bul 3002 — Dorr-Oliver Incorporated.

Check 1747 opposite last page.

Dry homogenization by centrifugal action is reviewed in four-page bulletin. Four-color photographs illustrate eight different products that have been processed with centrifugal mills. "Dry Homogenization" — Entoleter, Inc., subsidiary of American Manufacturing Co., Inc.

Check 1748 opposite last page.

Use of liquid nitrogen for pulverizing heat-sensitive, oxidation-prone or other problem materials is discussed in four-page bulletin. Examples are cited of products which are being ground by this technique. Bul "Liquid Nitrogen Pulverizing" — Liquid Nitrogen Processing Corporation.

Check 1749 opposite last page.

Distillation equipment is topic of eight-page brochure. Use and design of three principal types of trays — bubble cap, sieve and valve — are reviewed. Bul A-70 — Struthers Wells Corporation.

Check 1750 opposite last page.

Evaporators and crystallizers are reviewed in 34-page catalog. Chart showing steam economy of single- and multiple-effect evaporators is included. Cat 393 — Buflovak Equipment Division, Blaw-Knox Company.

Check 1751 opposite last page.

Plate-type heating coils — what they are and can do — are explained in 26-page brochure. Examples are cited on how to pick the correct size and shape for a particular vessel. Charts and tables are included. Bul 356 — Dean Products, Inc.

Check 1752 opposite last page.

Methods of controlling industrial dust and fumes are described in 20-page bulletin. Various dust collectors are depicted. Typical installations are shown. Bul 922A — Pangborn Corporation.

Check 1753 opposite last page.

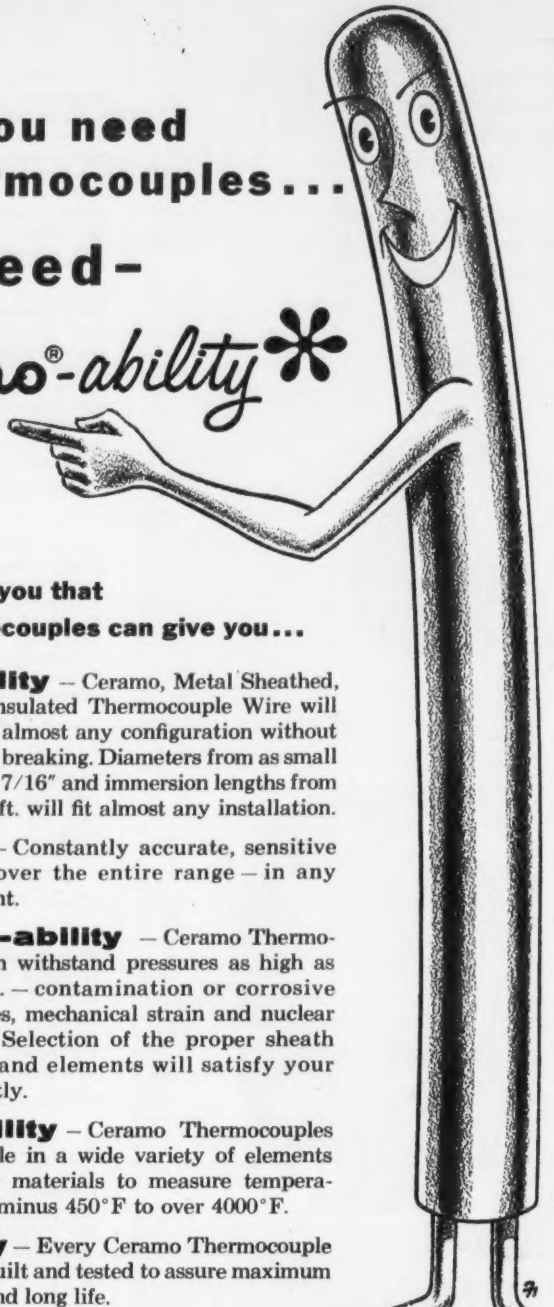
Wiped-film evaporator operation and maintenance is discussed in eight-page bulletin. Unit is designed for handling heat-sensitive and highly viscous materials. Bul 1006 — The Pfaudler Co., division of Pfaudler Permutit Inc.

Check 1754 opposite last page.

When you need Thermocouples...

You Need–

Ceramo®-ability*



Let us prove to you that
Ceramo Thermocouples can give you...

***Adaptability** – Ceramo, Metal Sheathed, Ceramic Insulated Thermocouple Wire will bend to fit almost any configuration without shorting or breaking. Diameters from as small as 1/25" to 7/16" and immersion lengths from 1/2" to 70 ft. will fit almost any installation.

***Stability** – Constantly accurate, sensitive response over the entire range – in any environment.

***Stand-up-ability** – Ceramo Thermocouples can withstand pressures as high as 50,000 psi. – contamination or corrosive atmospheres, mechanical strain and nuclear radiation. Selection of the proper sheath materials and elements will satisfy your needs exactly.

***Rangeability** – Ceramo Thermocouples are available in a wide variety of elements and sheath materials to measure temperatures from minus 450°F to over 4000°F.

***Reliability** – Every Ceramo Thermocouple is quality built and tested to assure maximum efficiency and long life.

Find Out About "Ceramo-ability" Today!

WRITE FOR YOUR 48-PAGE THERMOCOUPLE CATALOG TC-5

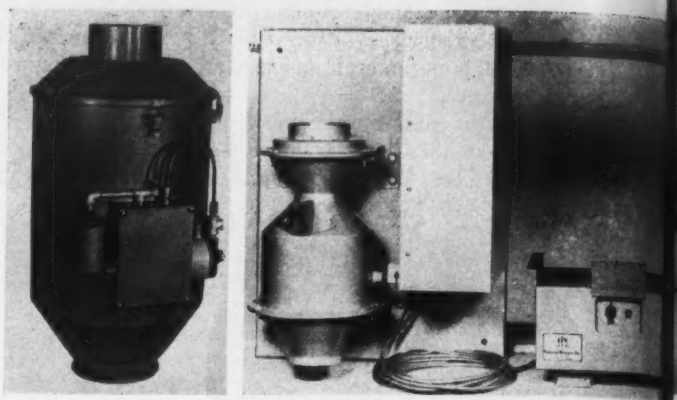
–information on all Thermo Electric Thermocouples and accessories.

Thermo Electric

THERMO ELECTRIC Co., Inc., Saddle Brook, New Jersey
In Canada: THERMO ELECTRIC (Canada) LTD., Brampton, Ont.

20 YEARS • *Temperature Measuring Systems and Components*

Check 1755 opposite last page.



Wallace & Tiernan (left) and Industrial Powertronix are both makers of solids-mass flowmeters incorporating mechanical sensing elements

Closing the loop in bulk-solids control . . .

Mass flowmeters score solid success

While lacking the space-age pedigree of their famous fluids-measuring cousins,* solids-mass flowmeters are causing every bit as much of a stir in those circles of operating management concerned with the measurement and control of dry solids

FOUR recently developed solids-mass-flowmetering systems have proved their mettle in initial CPI installations . . . thus providing operating management the missing link long needed in many bulk-material flow-control systems. The instruments have come through with flying colors in a wide variety of applications, from flour to wood chips.

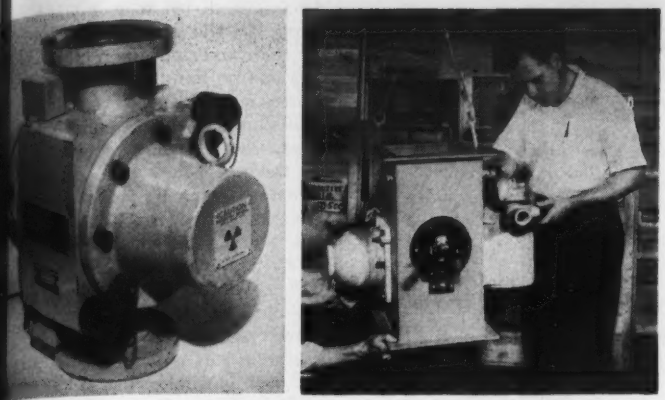
The solids-mass flowmeters are being greeted with open arms by the CPI for exactly the same reason their gases-liquids-slurries/metering counterparts are: Mass flow is the only true measure of how much material is passing through a system. In fact, the mass-flow/volume-flow desirability disparity is, if anything, greater with solids than it is with fluids.

This is because the calculation for converting solids-volume flow to solids-mass flow is a good deal tougher than the similar conversion with flow rates of fluids.

Obtaining accurate density figures for many dry solids presents a real problem. A given product can vary considerably in effective density from time to time due to the changing influences of humidity, settling and particle size.

Two of the four commercial-

* See "Mass flowmeters . . . ready to orbit in the CPI," September CP, p. 42.



Industrial Nucleonics (left) and Ohmart have successfully adapted their nuclear gages to the mass-flow measurement of dry solids

ly available solids-mass flowmeters incorporate mechanical sensing devices, while the others are both nuclear-gage systems.

Wallace & Tiernan Inc. is the maker of a mass flowmeter of the mechanical type. It has been used to proportion antibiotics, monitor flour streams and control dry-chemical delivery.

The stream to be measured falls on a rotating impeller driven by a synchronous motor. This motor is supported on flexure pivots and is free to move about the shaft's axis.

A torque is created on the motor frame when the particles of the stream are accelerated to the rotating-impeller velocity. This torque is proportional to the stream's mass-flow rate and is balanced by a pneumatic range unit.

The output of a booster pilot is controlled by a nozzle and flapper and is fed back to the range unit to counterbalance the torque. This output is thus proportional to the torque and can be recorded on a circular chart or used as a signal to a control loop.

Available capacity arrangements are 40 to 70, 65 to 125 and 110 to 200 lb/min. Each arrangement can be calibrated to produce a 15-psi signal for any flow rate within its capacity range. Range is 10:1 for any one arrangement. Volumetric capacity is six cfm, and the material measured should be heavier than eight lb/cu ft. Upper temperature limit is 150°F.

The pneumatic system makes a full correction for a step-flow change of 80% of full scale in less than 13 sec. All parts in contact with the material measured are made of stainless steel. Over-all dimensions are 29⅜" high by 20" wide.

Industrial Powertronix, Inc. has designed a mechanical-type solids-mass flowmeter which has successfully measured materials such as carbon black, pelletized products and wood chips, with an accuracy of ± 1%.

In this flowmeter, material to be measured is directed to an inlet spout from which it falls on a distributing disc. This disc can be either stationary, vibrating or spinning, depending upon how freely flowing the material is. It checks vertical velocity of material and disperses it evenly around the inside of the upper part of the housing.

Material then falls freely in the form of a hollow cylinder onto the hemisphere or sensing element. A small cone is superimposed on top of the hemisphere to prevent a build-up of material. Since this material falls a given distance, its impact upon the hemisphere is directly proportional to its weight.

Force of this impact is

Gardsman by WEST

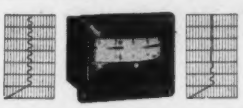
TEMPERATURE CONTROLLERS

serve your need Best

General characteristics: indicating *and* providing positive control; distinctively simple, convenient, reliable, economical; tubeless; plug-in meter units; thermocouple break protected; guaranteed; demonstrated and serviced from offices in many cities here and abroad. *See us at the Exposition of Chemical Industries, New York Coliseum, Nov. 27 thru Dec. 1, 1961.*

MODEL J SERIES

for Off-On control

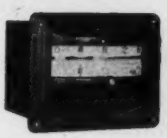


MODEL JP SERIES

for Proportioning control; more precise where heating-cooling factors are more dynamic

MODEL JL SERIES

combines High Limit and Off-on control

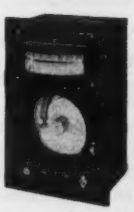


MODEL JE SERIES

Portable—ideal for laboratories

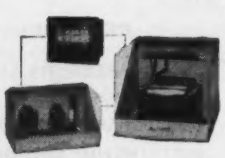
MODEL JG SERIES

provides Program control, applying any of above control actions to control both time and temperature.



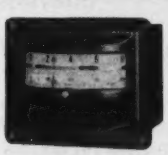
MODEL JSB SERIES

gives Stepless control; extremely precise



MODEL JT SERIES

gives 3-Position control for motorized valves, 3-phase heating, heating-cooling cycles



WEST Instrument CORPORATION

SUBSIDIARY OF GULTON INDUSTRIES, INC.

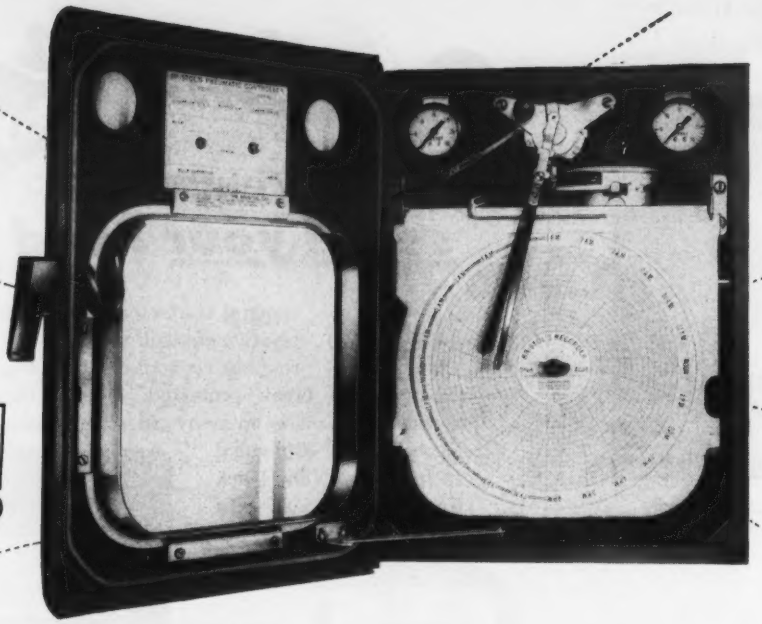
4357E WEST MONTROSE AVENUE, CHICAGO 41

Represented in Canada by Davis Automatic Controls, Ltd.

All controllers can be furnished for thermocouples or resistance bulbs. For data on these or other West instruments and accessories, use your classified phone directory or write direct.

the trend is to WEST

Check 1756 opposite last page.



NEW!

Bristol Series 532 A/D* pneumatic recording controller is outstandingly SIMPLE, RELIABLE, and STABLE

- **Simple modular design for ease of servicing**
- **High control stability for closer process control**
- **Designed for batch-type and continuous processes**
- **Proportional, proportional-plus-reset, and proportional-plus-derivative control models available**

Top control performance with maximum simplicity plus standard Bristol precision measuring elements—those are the key features of the Bristol Series 532 Recording Controller. The 532 uses the same renowned elements that have earned such a reputation for accuracy and dependability on other Bristol automatic controlling and recording instruments—perfected through wide experience and many years of development.

Self-contained modular design of the control unit speeds servicing. The whole modular unit, consisting of an aluminum casting with working parts made of stainless steel, Ni-Span C, and Neoprene diaphragms, can be removed by taking out only two screws and a link.

The die-cast aluminum instrument case (15¾ x 10¾ x 5¾ overall) presents a streamlined appearance and is completely dustproof and weatherproof.

Write for complete data on the new, versatile, economical 532 A/D. The Bristol Company, 141 Bristol Road, Waterbury 20, Conn., a Subsidiary of American Chain & Cable Company, Inc. 0.46

ACCO

CONTROL UNIT CHARACTERISTICS:

PROPORTIONAL BAND: 0-400% continuously adjustable, direct- or reverse-acting.

RESET: 0.1 to 100 repeats per minute.

DERIVATIVE: 0 to 10 minutes derivative time.

AIR PILOT: Non-bleed type.

PILOT CAPACITY: Over 3.0 scfm.

FREQUENCY RESPONSE: Essentially flat to 300 cycles per minute.

TEMPERATURE STABILITY: Less than 0.1% change in the output pressure for 90°F temperature change.

CHART: 8" diameter; wide variety available.

MATERIAL: Aluminum housing; 316 stainless steel internal parts; Ni-Span C feedback element.

RECORDING CONTROLLERS OFFERED FOR:

PRESSURE AND VACUUM: Ranges from full vacuum to 15,000 psi.

TEMPERATURE: Ranges from—100°F to +1000°F.

FLOW AND DIFFERENTIAL PRESSURE: With mercury-type manometer and dry-type differential unit.

LIQUID LEVEL: With bulb unit and mercury manometer and dry-type differential unit.

HUMIDITY: Zero to 100% relative humidity.

*Advanced Design

BRISTOL ...for improved production through measurement and control
AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

Check 1757 opposite last page.

transmitted by a rod which supports the hemisphere and is then exerted upon a bellows-force amplifier. The amplified force is exerted upon the transducer which emits an electrical signal proportional to the mass-flow rate. An air bearing forms the pivot point for the force read-out from the sensing element.

With dimensions of 22" x 18" x 11", the smallest model of the flowmeter can handle flows as low as five lb/min. Largest unit is of 36" x 33" x 24" and can take care of 3500-lb/min flows. There are seven sizes available.

Industrial Nucleonics Corporation has applied its nuclear gage to the successful measurement of dry-solids mass flow. INC's unit has been particularly well received in the cement industry, where recycle rates are important in control of closed-circuit grinding.

In this nuclear-gage set-up for solids-mass flowmetering, a gamma-radiation source and a radiation detector are mounted externally on opposite sides of the pipe or duct containing the material flow. Radiation reaching the detector is proportional to the amount of material in its path. The detector converts the radiation to an electrical signal. This signal is proportional to density of the material passing the point of measurement.

A prerequisite is that the material must pass through the radiation beam at a constant velocity. This condition is met by allowing the material to fall downward through one section of the conduit. Acceleration is due solely to the force of gravity.

If the material is fed by means of a uniform force, such as a star, screw or similar feeder, it will have a constant velocity at the measurement point. The cross-sectional area of the duct or pipe is constant. Therefore, the density signal may be directly calibrated in terms of mass flow (density x linear velocity x area = mass-flow rate).

Product temperature must be in the range of −60 to +500°F. There are no density

To page 174

THAT'S INTERESTING

A house in every keg

Instead of shipping bulky buildings long distances, the Army may resort to pouring the buildings out of barrels right on the site.

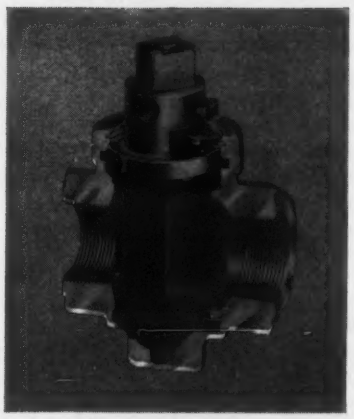
This possibility is being tested at Camp Century in Greenland where foam-in-place urethane foam is being used to make small huts — it's sprayed over forms. Nopco Chemical is furnishing the foam which is shipped at liquid density (60 lb/cu ft).

Evaporation of metals!

In a super vacuum such as will be encountered in outer space, some metals evaporate, Hughes Aircraft scientists find.

They are exploring the effects of space on materials by means of vacuum train apparatus fabricated to simulate the environment of space.

For more information on product at right, specify 1758. "See our exhibit at the Chem Show"



BROKEN GLASS AND PAPER WON'T CLOG THIS VALVE

W-K-M ACF Non-Lubricated EC Plug Valve

Many valves were tried for the tough job of controlling the flow of a caustic washing solution that often contained bits of bottle glass and labels, but W-K-M's EC Plug Valve was the only one that could do the job successfully.

We admit this is a problem you don't run into every day, but it's a good indication of the effectiveness of the W-K-M EC Plug Valve. Whatever type of service this valve is applied to it gives a tight seal that can be adjusted on the line when wear develops. Further it excels in the handling of solid bearing liquids or gases since its elastomer coated plug resists even severe abrasive action. The W-K-M EC Plug Valve requires no regular maintenance since it is non-lubricated.

Write for specification sheet AE-1061 for full details.

WHEN SO MUCH DEPENDS ON A VALVE...SPECIFY W-K-M ACF

W-K-M
DIVISION
ACF INDUSTRIES

P. O. BOX 2117 HOUSTON, TEXAS

neptune

An advertisement written to help you

Measurement/Control News

prepared by Neptune Meter Company

Automatic Meters Improve Viscosity Control in Latex Paints

Two Neptune Auto-Stops replace gauge sticks in measuring Polyvinyl acetate and water

KANSAS CITY, MO.—To save time lost making adjustments in viscosity of latex base paints, Seidlitz Paint & Varnish Co. now uses accurate positive displacement meters on both polyvinyl acetate latex and water.

Batches formerly were measured by gauge stick or tank marks. Many required final adjustments to meet rigid viscosity standards.

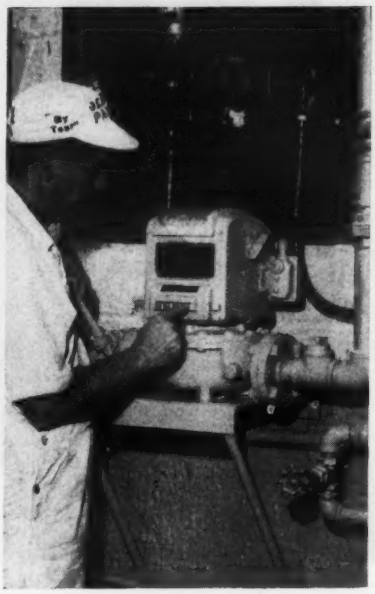
Push-buttons set quantity

Drying agents, pigments and bodying agents are first mixed in 54-inch Cowles dissolver with a preset quantity of water metered through 1-in. Neptune Auto-Stop meter. Operator pushes buttons to set meter, opens valve, then spends time on dry ingredients while meter is operating. Meter shuts off automatically.

This grinding mix, followed by a quantity of wash water to clear out the mixer, then goes to a finishing tank downstairs, where latex and thinning water are metered in. Latex meter is 1½ in. Auto-Stop, with a double-trip valve which prevents hydraulic shock in lines by providing 2-stage closing.

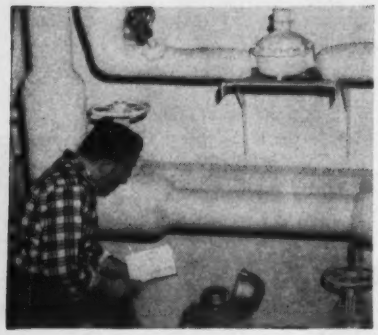
Auto-Switch turns off pump

An explosion-proof switch is featured with the metering equipment to automatically control the latex pump located in the basement. The registers



are equipped with cumulative totalizer and large numeral wheels which are reset with each batch.

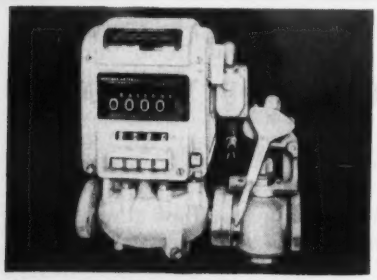
The meters have been in use for 18 months with a fine record for accuracy, states Vice President R. W. Brown. Meters make savings like this with hundreds of industrial liquids. The Neptune sales representative near you can offer helpful suggestions regarding meter size and type.



Ansco Finds Savings With 100 Meters

BINGHAMTON, N.Y.—Making fine films requires millions of gallons of water daily . . . much of it expensively treated. Using over 100 water meters, Ansco Manufacturing Co. has cut costs to the bone by finding ways to re-use water an average of *2½ to 3 times*.

In one case, the same well water passes through *seven* uses: air conditioning, spray washing, chemical dehumidifier, heat exchanger, ammonia condenser, fire protection reservoir, and finally, roof cooling. The meters help compute heat exchange values, blending proportions, chemical treatment, etc., and each department is charged for what it uses.



Switch on Meter Automatically Controls Pumps

Highly educated meter incorporates an explosion-proof switch which trips when any preset quantity of liquid has passed through. Can be used to actuate solenoids, start and stop pumps, agitators, etc.

METER CALIBRATION is quick and easy with Neptune "400" registers. Remove register cover, lift shifter plate, turn to desired setting, drop into place. Once set, it's gear-locked, can't drift or shift. Neptune recommends regular testing, will show you how.

HELPFUL METERING DATA AVAILABLE

28-pg. technical bulletin lists liquids, helps pick proper sizes and features of meters 2 to 2000 gpm.

NEPTUNE METER COMPANY • Liquid Meter Division
47-25 34th St., Long Island City 1, N.Y.

Please send me helpful Meter Bulletin 566NP

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____ CITY & STATE _____

Check 1759 opposite last page.

From page 172

or flow limits.

The Ohmart Corporation manufactures a nuclear-gage solids-mass flowmeter which is similar to that made by Industrial Nucleonics. In its first installation, however, a beta-radiation source (strontium-90) is used in lieu of the conventional gamma source.

Operation of the gage is based on the Bremstrahlung effect, in which a beta ray hitting solid material causes the material to emit X-rays. These reach the conversion cell in proportion to the amount of material passing the measurement point at any given instant.

Beta sources will be employed in installations where the velocity of the process is high (10 ft/sec) and quantity of material small. Gamma sources are to be used in slow-velocity (three-ft/sec) high-quantity applications.

In the first installation previously mentioned, fine cement powder is measured after it passes over an air slide and is falling through a gravity-feed pipe into a kiln for burning.

This has permitted finer control over the amount of cement powder reaching the kiln . . . thus improving cement quality and production efficiency.

Additional information on the solids-mass-flowmetering systems discussed in this article may be obtained from the following manufacturers:

Industrial Nucleonics Corporation, 650 Ackerman Rd., Columbus 2, Ohio.

Check 1760 opposite last page.

Industrial Powertronix, Inc., 621 S.W. Morrison St., Portland 5, Ore.

Check 1761 opposite last page.

The Ohmart Corporation, 2236 Bogen St., Cincinnati 22, Ohio.

Check 1762 opposite last page.

Wallace & Tiernan Inc., 25 Main St., Belleville 9, N.J.

Check 1763 opposite last page.

For more information on developments in this section, check the Reader Service Slip.

THAT'S INTERESTING

Marketing patents

Computing machines are being used to bring inventors and prospective buyers and users together.

This service is provided by the Institute for New Products, Inc., located at Ardsley-on-the-Hudson, N.Y.

An inventor's patent is first analyzed and a coded profile of its characteristics prepared for use in sorting cards, magnetic tape and, ultimately, high-speed data processing equipment.

The patents, so analyzed, are electronically paired with coded requests from firms seeking new products and processes.

After introducing inventor and prospect, the Institute withdraws and negotiations are continued privately.

Cost of service is less than inventor might spend for cigarets in a year.

For more information on product at right, specify 1764 see information request blank opposite last page.

A NEW ADDITION TO THE SONAC *LINE*

POSITIVE ULTRASONIC LEVEL CONTROL

The components of Sonac (sensor actual Size)

Now, two new ultrasonic sensors, especially for level control have been added to the Delavan line of SONAC sensing and switching devices.

The single sensor system is recommended for liquid level control and the double sensor system for dry level control.

Control is maintained by installing the SONAC sensor through the wall of the vat, bin or hopper. When the oscillation on the face of the sensor is dampened or impeded by the material being sensed, the signal to the control unit changes, activating a relay.

FIG. 1—LIQUID LEVEL (One Sensor)

FIG. 2—DRY LEVEL (Two Sensors)

For level control, SONAC is accurate to .005" and has a response time of 25 milliseconds. Performance of the sensor does not deteriorate with age.

The level control uses to which SONAC can be applied are virtually unlimited. It is not affected by the viscosity*, specific gravity, conductivity, or capacitance of the material being sensed. Temperature or pressure changes of the material do not alter its performance. False signals are eliminated because SONAC may be adjusted so as not to sense steam, foam, or vapors.

*Viscosity may affect response time.

Canadian Representative:

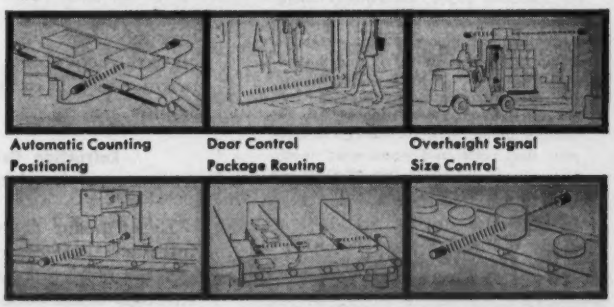
KNOWLES & FOSTER (North America) Ltd.

708 Terminal Bldg., Toronto 1, Ontario, Canada

SONAC is extremely rugged. Sensors are type 304 stainless steel. The electronic components in the sensors are hermetically sealed and will withstand pressures to 2000 psi and temperatures from −425° F. to +450° F. They are immune to shock, vibration or mechanical damage.

The control is a compact unit 5" x 5" x 5" and features transistor circuitry. Power consumption is one watt and the unit will operate in temperature ranges from 40° F. to 135° F.

Here's how SONAC can be used for sensing and switching applications other than level control.



Automatic Counting Positioning | Door Control Package Routing | Overheight Signal Size Control

There are dozens of applications for SONAC *single and double sensor units. Let it go to work for you now, write:*

DELAVAN Manufacturing Company

WEST DES MOINES • IOWA

A

FLEXIBLE TUBING OF TEFLON*

Look at What this tubing offers:

- stays flexible and tough even at minus 450°F or higher than 500°F
- unaffected by any commercial solvent to provide very long life
- easily cleaned and sterilized because of its smooth, chemical resistant surface
- its translucency shows fluid flow

Look at the extra reliability PF builds into it:

- tight tolerance control and consistent uniformity
- a tensile strength greater than 3000 psi and an elongation greater than 200%
- devoid of flaws and impurities
- is scrupulously inspected and 100% proof pressure tested . . . your guarantee of a high quality product

Let PENNSYLVANIA FLUOROCARBON fill your requirements for flexible tubing of Teflon and you can be sure of getting what you pay for. This tubing is widely used for acid, solvent or catalyst lines; for sampling tubes, laboratory tubing, fuel and hydraulic lines; for food, pharmaceutical and medical tubing where the unique properties of Teflon and the extreme reliability of PF extrusions apply.

Let us bid on your requirements for flexible tubing of Teflon tailored to meet your size, color and application needs. Flare, insert and ferrule type fittings can be used with this PF tubing.

*Du Pont Reg. T.M.

PENNSYLVANIA FLUOROCARBON CO., INC.
1115 N. 38th Street, Philadelphia 4, Pa.
Phone EVergreen 6-0603 TWX: PH 252

"See our exhibit at the Chem Show"

Check 1765 opposite last page.

CHEM SHOW highlight

Murky solutions mastered by in-line refractometer in measuring at surfaces

Instrument is equally adept with slurries or solutions

Uses: Measuring refractive indexes of process streams.

Features: Refractometer measures refractive index at surface of liquid sample. Since surface refraction requires no penetration of white beam into solution, instrument may be used for highly opaque and various murky solutions and suspensions, as well as transparent solutions.

In-line refractometer measures refractive index of process streams at surface of liquid samples

Description: In-line refractometer utilizes critical-angle technique of measurement. In operation, light beam from incandescent lamp is directed through lens and out back of explosion-proof housing to prism which is in contact with sample.

Refraction Occurs at Interface

Light beam is refracted at interface between prism and process fluid and directed back through beam deflector to two cadmium-sulphide photocell detectors.

One photocell is located in pure-white-light section, while other is mounted at critical-

THIS SELF-CONTAINED FLUID COOLING SYSTEM

...gives most accurate temperature control

Applied in cooling industrial machines or processes to temperatures approaching the ambient wet-bulb, the NIAGARA *Aero*® HEAT EXCHANGER is independent of any more than a nominal water supply or disposal. The coolant system is a closed one, free from dirt and maintenance troubles.

Heat is removed from your process *at the rate of input,* giving you precisely the temperature you require and assuring the quality of your product. Heat may be added to prevent freezing in winter or for better control in a warm-up period. Liquids or gases are cooled with equal effectiveness.

Heat is rejected outdoors. Only the little water evaporated on the cooling coils in the air stream, or discharged to prevent hardness build-up, is consumed.

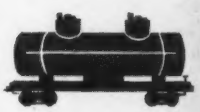
Niagara sectional construction saves you much installation and upkeep expense, gives full access to all interior parts and piping. Your equipment always gives you full capacity and "new plant" efficiency.

Write for Niagara Bulletin No. 132 for complete information

NIAGARA BLOWER COMPANY
Dept. CP-11, 405 Lexington Ave., New York 17, N.Y.
District Engineers in Principal Cities of U. S. and Canada

"See our exhibit at the Chem Show" Check 1766 opposite last page.

Whether your liquid measuring problem involves

GALLONS —or BARRELS —or TANK CARS 

THE *Fluidometer* SYSTEM

WILL GIVE YOU ACCURATE—AND COMPLETELY AUTOMATIC—BATCHING

If you have a liquid batching problem involving either light or heavy liquids, it will pay you to investigate the Fluidometer System. This completely automatic system, with its exclusive automatic reset, gives accurate, dependable batching and is adaptable to practically any liquid measuring problem, whether it involves gallons, barrels, or tank car lots. Available in either jacketed or unjacketed construction.
Write for Bulletin Fl-56.

HETHERINGTON & BERNER INC.
A Wholly Owned Subsidiary of American Hoist & Derrick Co.
701 KENTUCKY AVENUE • INDIANAPOLIS 7, INDIANA

Check 1767 opposite last page.

The Right Gauge for every need

Mastergauge GROUP and companion "Master-test" group for extreme services requiring the ultimate in accuracy and stamina.

Quality GROUP also for tough services, but less severe than the conditions served by the "Mastergauge"

Standard GROUP for the general run of gauge services. Marsh quality and accuracy at a moderate price.

Within these three comprehensive Marsh groups you have the world's widest (yes, and wisest) selection of pressure gauges. These groups of gauges are not *grades* ...they are *kinds*... the MARSH kind... which means that each gauge, within the scope of its rated use, is the BEST of its kind!

Pick the right Marsh Gauge and you have the best answer to your gauge problem.

Ask for latest data

MARSH INSTRUMENT COMPANY

Division of Colorado Oil and Gas Corporation • Dept. 4 Skokie, Ill., Marsh Instrument & Valve Co. (Canada) Ltd., 8407 103rd St., Edmonton, Alberta • Houston Branch Plant, 1121 Rothwell St., Sect. 15, Houston, Texas • Eastern Seaboard Warehouse: Marsh Instrument Company, 1209 Anderson Ave., Fort Lee, N.J.

MARSH

GAUGES • THERMOMETERS VALVES

Check 1768 opposite last page.

angle point where beam changes from light to dark. (At angles smaller than critical angle, light is transmitted into liquid and at angles larger than critical angle it is totally reflected.)

As refractive index of process fluid changes, critical angle changes, thus causing more or less light to fall on the one photocell detector. The other cell, of course, remains always in full-intensity portion of beam.

(In-line refractometer is product of Waters Associates, 45 Franklin St., Framingham, Mass.)

Check 1769 opposite last page.

Inclined manometer tube gives scale divisions more elbow room

Stainless-steel straight edge provides tube support

Uses: Measuring pressure, vacuum, differential pressure, or flow.

Features: Inclined-tube design gives wider spacing of scale divisions, contributing to readability. Manometers each have tube supported on ground stainless-steel straight edge. Each scale is calibrated inch-by-inch to particular manometer.

Description: Inclined-tube manometers are available with

Tube of manometer is supported on ground stainless-steel straight edge; each scale is calibrated inch-by-inch to its particular manometer

vertical ranges of 2 to 20" and in scale lengths of 20 to 60". Maximum working pressure is 100 psig.

(Manometers are detailed and specified in Cat 2008—The King Engineering Corporation, Box 745, Ann Arbor, Michigan.)

Check 1770 opposite last page.

KUHNS

DUCTILE IRON PIPE FITTINGS*

CORROSION RESISTANT TO PROVIDE LONGER SERVICE LIFE

If your biggest maintenance problem is downtime for replacing fittings, you'll be interested in the money saving advantages of Kuhns Ductile Iron Pipe Fittings.

Their superior corrosion resistance, high strength and ability to withstand shock assure extra years of service, help reduce operating costs and simplify maintenance. Their smooth bore helps eliminate clogging, keeps systems working at maximum efficiency.

Wide Selection With a complete line of cast iron fittings and the newly developed ductile series, Kuhns offers the *right* fitting for practically every purpose. Choose from all types of flanged fittings from 1½" through 12"; companion flanges from 1" through 12"; screwed fittings from ¼" through 12". Over 3000 sizes and shapes, available coated, galvanized or uncoated to meet your specific requirements. Write for full details.

*Kuhns ductile fittings are listed and pressure rated by the Underwriters' Laboratories, Inc. All Kuhns fittings are available nationally through better wholesalers.

THE KUHNS BROTHERS CO.
1800 McCALL STREET • DAYTON, OHIO

Visit Kuhns in Booth 1444 at the Chemical Show in New York City, Nov. 27 — Dec. 1.

Check 1771 opposite last page.

CHEM SHOW highlight

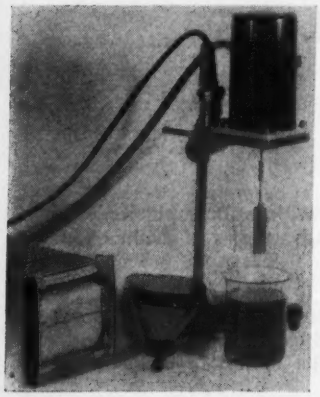
Meter takes no rest in keeping tabs on viscosity

Automatic and direct readout is given in cp

Uses: Viscosity determination for such non-Newtonian properties as pseudo-plasticity, plasticity and dilatancy. Instrument can also be used to obtain flow curves of thixotropic, rheopectic, time dependent and temperature-dependent materials.

Features: Viscometer gives continuous automatic and direct determination and permits permanent record of viscosity.

Description: The viscometer is portable. It is compatible with standard indicating or recording equipment and is available with either pneumatic or electric signal transmission. Remote transmission is possible at distances to 100'.

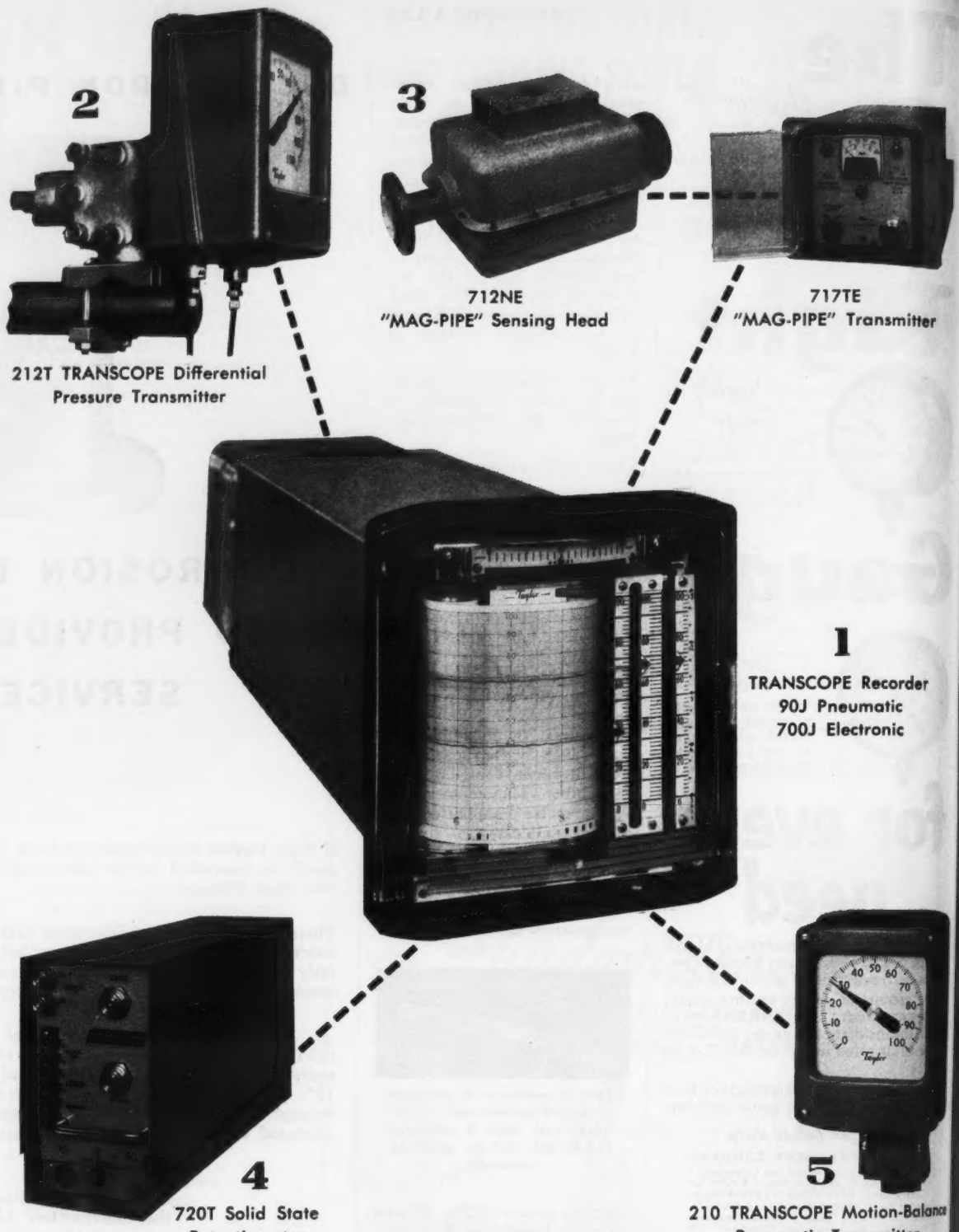


Viscometer can determine such non-Newtonian properties as pseudo-plasticity, plasticity and dilatancy

The viscometer may be obtained in 1, 4 or 8 speeds for readings of 0 to 64-million cps, and ratio of max-to-min range can be as high as 80,000:1.

(Brookfield Rheolog is described in Bul RL 100—Viscosel Corporation, Box 240, Stoughton, Mass.)

Check 1772 opposite last page.



Taylor Instruments

SEE *Taylor*

ACCURACY IN ACTION

AT THE CHEMICAL SHOW

New Transmitters designed to take advantage of the superiorities of TRANSCOPE® RECORDERS

1 TRANSCOPE Recorders. 90J (pneumatic) and 700J (electronic) are the most convenient, most compact instruments yet developed for modern instrument panels. Powerful Servomatic motors give unprecedented recording accuracy, (½ of 1% standard; ¼ of 1% optional) also permit use of auxiliary functions such as integral alarms, retransmitting potentiometers, function generation and digital encoding etc. Front-of-panel control settings permit easy adjustment while recording. Write for **Bulletin 98286** (pneumatic) or **98335** (electronic).

2 212T TRANSCOPE Differential Pressure Transmitter. First and foremost a superior DP transmitter. Also the only DP Transmitter that can be calibrated for output *linear* with flow as well as differential pressure without changing parts. Servo power permits ratio and cascade control without intermediate, separate square root extraction. Simple analog computations involving flow and other variables handled pneumatically without a separate black box. Indicating and "blind" models. Write for **Bulletin 98413.**

3 MAG-PIPE* Magnetic Flowmeter Transmitter. Output signal of 1-5 ma gives high accuracy (½ of 1%) up to 10,000 feet, making centralized control rooms practical. Measures flow of liquids with electrical conductivity as low as distilled water. Ideally suited for very low flows, viscous liquids, and liquids containing suspended solids. Sensing head mounts in flow line—available with lap joint (Van Stone type) or sanitary type pipe connections. Transmitter is solid state for long reliability. Write for **Bulletin 98418.** *Trade-Mark

4 720T Solid State Potentiometer Transmitter handles millivolt inputs and thermocouple inputs and provides a milliampere output. Fully transistorized including chopper; continuous vernier adjustment for span and zero; high calibrated accuracy (± .25% above 10Mv, ± .5% below 10 Mv.); multiple outputs—3 to 15 psi., 1 to 5 Ma DC; Output load 3000 ohms max. Full scale in 1.2 seconds. **Bulletin 98388**

5 210T TRANSCOPE Motion-Balance Pneumatic Transmitter for gage pressure, volumetric pressure, volumetric load, and temperature transmission. Accuracy of transmitted signal is within ½% of input. Indication is ± 1% of actual value. Threshold sensitivity of 0.1% of input span. Big scale easily readable up to 35 ft. away. Only three basic parts for easy maintenance. Write for **Bulletin 98385.**

All of these instruments will be demonstrated along with many others in the Taylor **Booth 104** *at the Chemical Exposition. Be sure to stop in and see them. If you aren't attending the show ask your Taylor Field Engineer for a demonstration or write for Bulletins. Taylor Instrument Companies, Rochester, New York, and Toronto, Ontario.*

MEAN ACCURACY FIRST

Check 1773 opposite last page.

NEW LITERATURE

Process Instrumentation and Laboratory Apparatus

Laboratory glassware is reviewed in eight-page catalog supplement. Graduated cylinders, filtering flasks, immersion heaters, measuring beakers and optical cover glasses are all specified in Supplement 3, Cat LG-2 which is available on letterhead request from Corning Glass Works, Corning, New York.

Temperature programmer, designed for linear or non-linear temp programming of laboratory gas chromatographs, is credited with shortening analysis time of samples having components with wide range of boiling points. Bul 792 — Scientific and Process Instrument Division, Beckman Instruments, Inc.

Check 1774 opposite last page.

Micro-particle classifier with working scope below 60 microns and capable of completing an 8-fraction analysis in 2 hr is described in Classifiers Cat — Harry W. Dietert Company.

Check 1775 opposite last page.

Industrial TV monitors, including 14", 17" and 21" screen sizes in both cabinet and rack-mount models, are described in four-page bulletin. Included is detailed information on performance, reliability, operating and maintenance costs. Bul ECL 92 — Communication Products Department, General Electric.

Check 1776 opposite last page.

Laboratory furniture line includes all basic units: cabinets, counter tops, tables, desks, lockers, fume hoods, sinks, carts, chairs and the like. Units are all dimensionally standardized and may be re-arranged to suit changing lab requirements. Furniture is depicted in 24-page Cat LF-61 — Will Corporation.

Check 1777 opposite last page.

Control valves are treated in 64-page bulletin taking up pneumatic diaphragm and piston actuators . . . and variety of valve-body assemblies. A 20-page specifying section contains necessary information for control-valve selection. Bul E600—Fisher Governor Company.

Check 1778 opposite last page.

Plastic tubing and fittings for variety of applications are discussed in 12-page catalog which also includes chemical resistance table and price list. Tubing Cat — The Cobon Plastics Corporation.

Check 1779 opposite last page.

Standard conveying components tackle unusual application as . .

Engineering ingenuity finds way to feed clay at one-third cost

Problem: Looming large in the cost calculations when the modern addition was being planned for the Attapulgus, Ga., plant of Minerals & Chemicals Philipp Corporation, were three specialized clay feeders.

A NEW SOLUTIONS FEATURE

Costing $10,000 to $12,000 each, the feeders seemed to offer the only means of delivering blends of clay from three process bins to the pugger in closely controlled quantities — a "must" for the Philipp operation.

At Attapulgus, additives are mixed with blends of clays and the resulting formulation extruded into pellets for use as cracking catalysts in the production of high-octane gasoline.

Solution: During a discussion of the handling system for the plant addition, a representative of a conveying-equipment manufacturer suggested that the clay-metering operation could be accomplished by unconventional use of less-expensive standard conveying components.

He pointed out that the process bins could be aerated so that the materials in the bin, thus fluidized, would be at a uniform bulk density. By keeping the material head within rigid limits, a feeder operating at a specific rpm would always discharge the same amount of clay.

Since the specialized feeders could be installed later if necessary, Philipp management decided to experiment.

The handling system which evolved from this decision is studded with some unique features. These are detailed in picture-story form on the facing page.

Briefly, a pneumatic conveying system unloads railroad cars and passes the clays to an outdoor filter mounted atop two silos, each storing a different type of clay. From the filter, the clay passes into a fluidizing conveyor and to the silos.

Clay is reclaimed from each silo through a rotary feeder equipped with a variable-speed drive. By adjusting the speed of each feeder, an operator can blend the two clays to desired ratio.

A second pneumatic conveying system takes the clays to another filter mounted above the three process bins in an adjacent building. From the filter, the blend passes into a surge hopper, through a vibrating screen and into another fluidizing conveying system.

This system is connected to the three process bins by three motor-operated side-discharge valves. Each valve is actuated by dual material-level indicators in the bin it serves.

It is this part of the system which helped obviate the need for the special feeders. Each bin is equipped with a high- and low-material-level indicator, spaced 18″ apart on the side of the bin. This range was determined by trial and error.

When the material head reaches the low level in a bin, that indicator actuates the proper side-discharge valve on the conveying system, and the clay blend flows into the bin until the high-level indicator shuts off the discharge valve.

This diverts the clay to another bin, even though the low-bin signal there has not been actuated. This procedure continues until all three bins have been filled to the high-level point; then the system is shut down.

A high-level indicator in the surge hopper above the process bins automatically shuts off the feeders at the bottom of the storage silos when too much material builds up in the surge box.

The process bins have shallow sloping bottoms and vertical front sides. Inside the shallow bottoms are several 8″ open-type aeration sections.

Material from the process bins is metered to the pugger through rotary feeders, which are also equipped with variable-speed drives. These discharge a precise quantity of clay at any given speed.

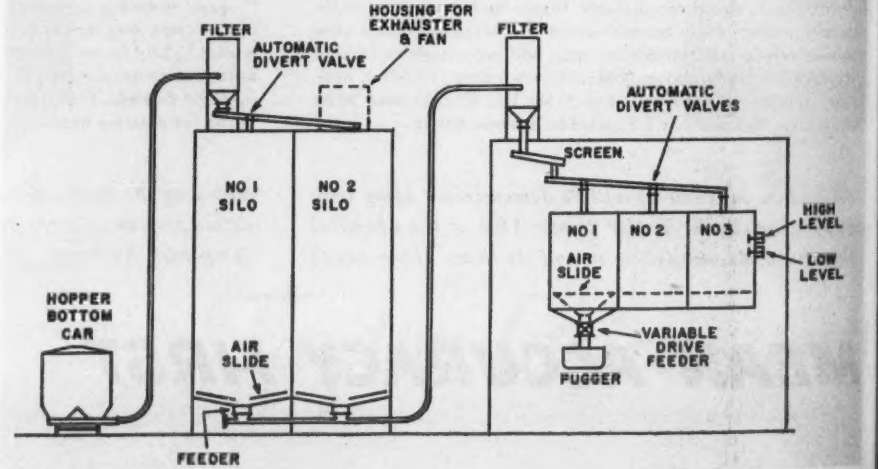
Results: Minerals & Chemicals Philipp is able to meter additives accurately into further process equipment by setting the speed of the feeder, which achieves nearly perfect blending of additives and clays to get the right consistency to feed the extruders.

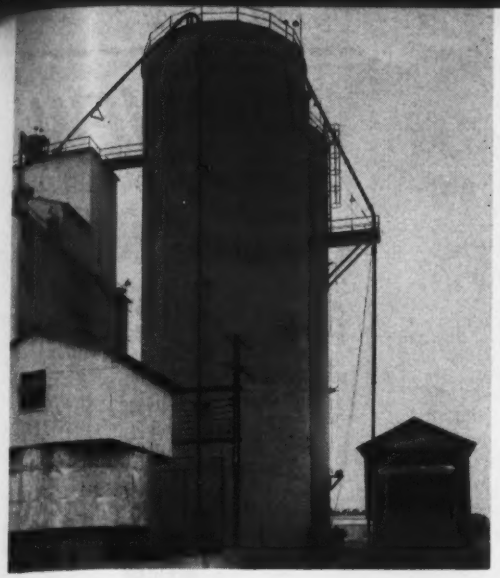
The unique approach to metering clay from the process bins enabled the company to equip the bins at about one-third the cost for specialized feeders.

(Airveyor-Airslide conveying system at the Attapulgus, Ga., plant utilizes components manufactured by Fuller Company, subsidiary of General American Transportation Corp., Catasauqua, Pa.)

Check 1780 opposite last page.

Flow Diagram of Handling System





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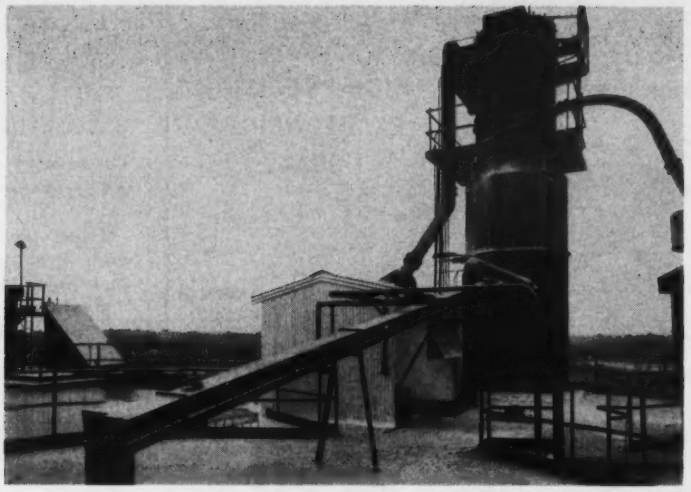

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UNIQUE FEATURES STUD CLAY-HANDLING SYSTEM

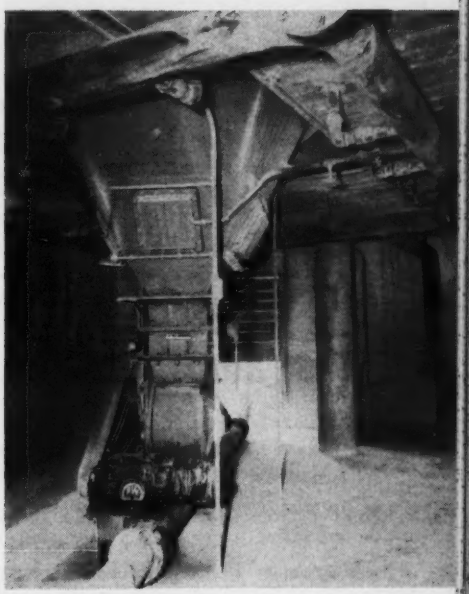
1 CLAYS ARRIVE at the plant by rail in either standard box cars or hopper bottom cars and are unloaded by a pneumatic conveying system. Two 6″ fan-type nozzles are used to suck up the material in standard box cars while a twin-nozzle unloading unit is used to empty hopper-bottom cars. These feed the clay into a telescoping pipe, 30′ long and 8″ in diam, which in turn connects to a flexible metal hose, 25′ long and 7″ in diam. The telescoping pipe is raised and lowered by a cable-drum-gearmotor arrangement mounted on the side of the second silo. Weatherproof high- and low-limit switches on the silo side restrict telescope travel. The unloading operation is controlled from a panel at ground level. Capacity is 40 ton/hr for clays weighing 40 lb/cu ft.

2 AT OUTDOOR FILTER, atop one of the silos, the clay is transferred to a fluidizing conveyor housed in the 20′-high bell bottom of the filter. This conveyor, 53′ long and 10″ in diam, distributes the clay to either of the two silos. Equipment house (center) holds exhaust and fan.

3 RECLAIMING MECHANISM is located under the 100′-high, 30′-diam concrete silos. Hopper (center) delivers material through rotary valve and feeder into a second pneumatic conveying line (visible on side of silo in photo 1). The main header system, forming a square at the top of photo 3, takes air from a blower in the background into 12 aeration units inside the silo. These are spaced like the spokes of a wheel along the sloping bottom of the silo. Square aeration pads are attached to the pyramidical hopper. Rotary feeder (mounted just above pipe in forground) is equipped with variable-speed drive. Through an adjustment of the speed of this feeder and the similar feeder on the other silo, virtually any percentage blend can be made of the clays drawn from the two silos.

4 AT 10-TON/HR RATE, the clay blend is carried alongside silo and over to adjacent building to a second outdoor filter located directly over the three process bins. Bottom section of filter (shown) delivers the clay through an airlock into a surge hopper which discharges it through a flexible connection to the vibrating screen (bottom). Bin indicator on right side of the surge hopper stops the metering feeders under the silos if too much material is being delivered.

5 SPOUT FROM SCREEN (upper right) delivers blend to fluidizing conveyor where it is distributed to process bins by motor-operated side-discharge valves. Bin indicators actuate valves.



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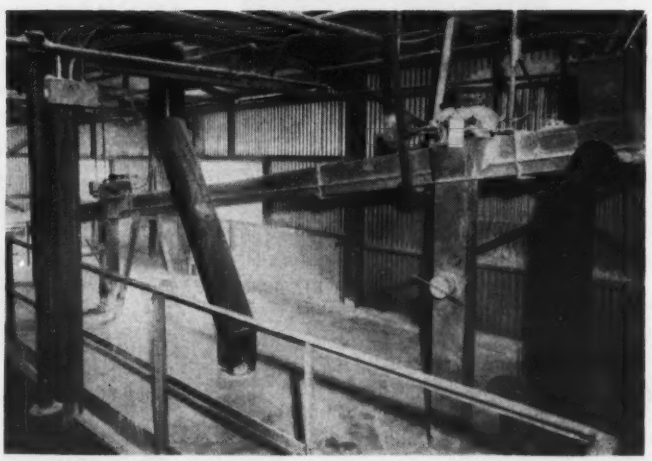

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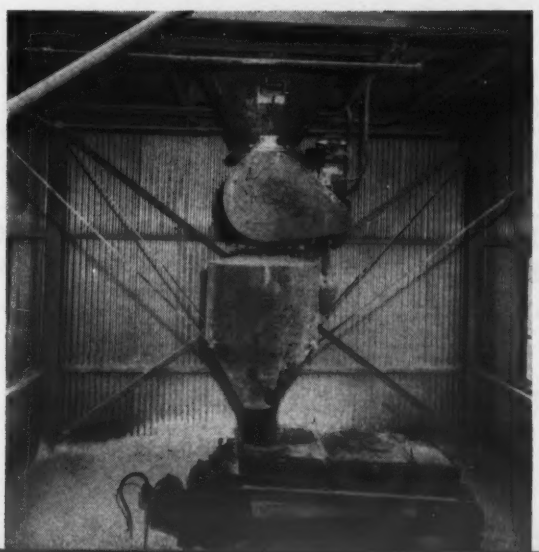

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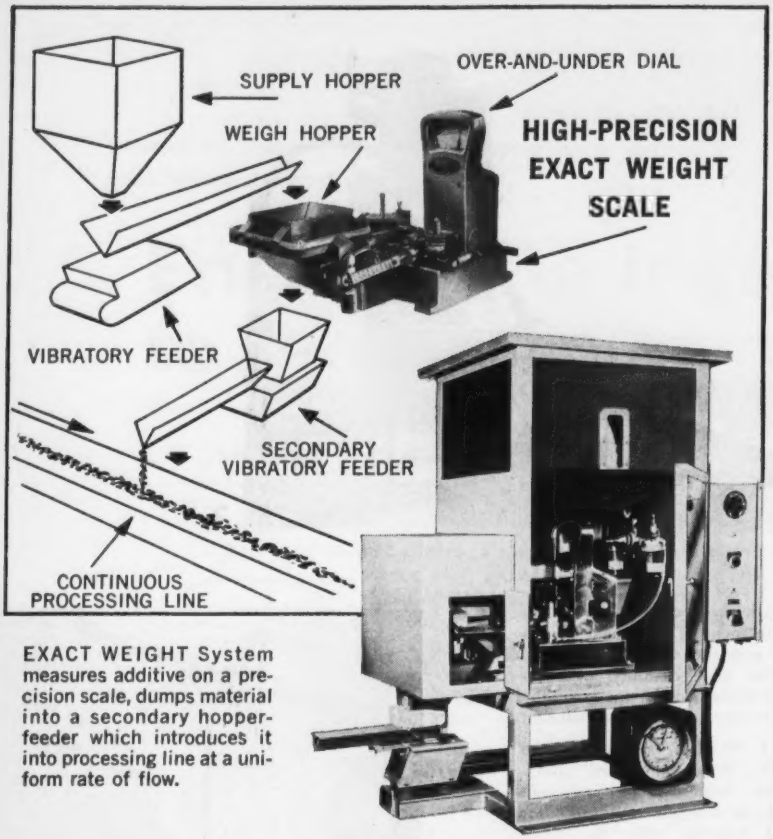

EXACT WEIGHT System measures additive on a precision scale, dumps material into a secondary hopper-feeder which introduces it into processing line at a uniform rate of flow.

EXACT WEIGHT® CONTINUOUS WEIGHER inserts additives in precise amounts

This Exact Weight Continuous Weigher inserts loose, free-flowing granular solids into processing lines in exacting quantities. Accurately-timed feeding of material over a given period of time assures controlled integration into the processing stream.

Exact Weight machines of this type are currently being used in the processing operations of foods, chemicals and pharmaceuticals. Machines are fully enclosed for protection against contamination. Models are available in a range of capacities from one gram to 300 pounds.

Exact Weight equipment is backed by more than 45 years of experience in building job-engineered scales for all types of applications. We offer experienced counsel and factual data on the best method for weighing your product. For complete information on the Exact Weight Continuous Weigher, request Bulletin 3311.

Exact Weight SCALES

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Sales and Service Coast to Coast

BETTER QUALITY CONTROL . . . BETTER COST CONTROL

"See our exhibit at the Chem Show"
Check 1781 opposite last page.

CHEM SHOW highlight

Three-way mixing action offers accurate control

Uses: Mixing liquids, powders, granules and other dry materials.

Features: In tests, mixing accuracies have been attained up to 0.01%. Power requirements are low. A 5 hp motor can mix a 4000-lb batch.

Description: Mixer has a conical shell as the mixing chamber. The mixing action is affected by a special helicoid screw that rotates at approximately 62 rpm as the screw simultaneously orbits the entire inner circumference of the shell.

It can be started while fully loaded. Heat buildup is held to a minimum, materials remaining a compact mass while being mixed.

Mixer is available in sizes ranging from 3½ to 122 cu ft working capacity.

(Nauta mixer is described in Bul 1060 available from The J. H. Day Company, division of The Cleveland Automatic Machine Company, 4932 Beech St., Cincinnati 12, Ohio.)

Check 1782 opposite last page.

Push-button palletizer

. . . can be operated by one man to palletize bags and cartons in any pattern at a speed up to 20 units per minute. System consists of a patented swivel stacker and a powered indexing pallet table which the operator rotates by push buttons.

(Flex-Bend palletizer is a development of The R.T. Sheehan Company, 8090 N. Territorial Rd., Plymouth, Mich.)

Check 1783 opposite last page.

they're **NEW**

they're pneumatic

Visit us in booth 993-95 at the 28th Exposition of Chemical Industries. New York Coliseum. November 27 to December 1, 1961.

The Cleveland Vibrator Company presents: Cleveland's new vibrating feeders and conveyors to handle your difficult-to-move bulk chemicals—safely—surely—accurately.

Only one moving part. Mounting is easy, no springs to tune . . . and the cost is surprisingly low.

Variable flow completely controlled, with instant start and stop.

Write today for complete information and prices.

2706-11 Clinton Ave., Cleveland 13, Ohio

Check 1784 opposite last page.

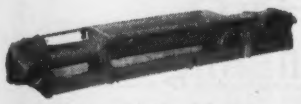
Low-silhouette facilitates installation of pump to unload rail cars

Conveys pulverized solids at rates up to 300 bbl/hr

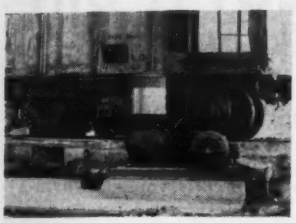
Uses: Pneumatic unloading of pulverized materials from rail cars.

Features: Because of low silhouette, pump requires a trench only 17" deep below bottom of rail. It is designed for fast, easy connection to hopper-bottom car outlets.

Description: Pump and air supply have been integrated into package form for actual applications to facilitate selection of proper power and air combinations. Single-stage, positive-displacement blowers minimize investment for power and air requirements, according to manufacturer.



Dry-solids pump (above) is shown below installed beneath railroad tracks

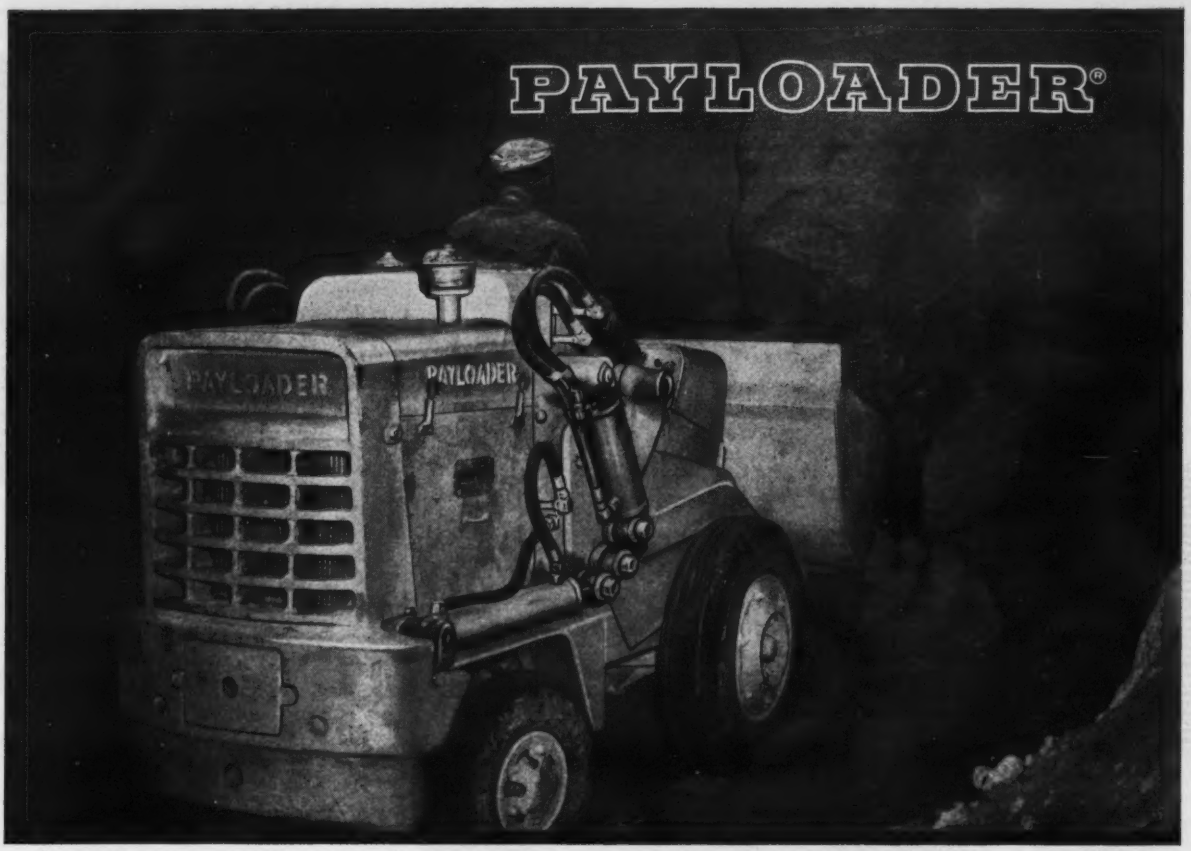


Pump handles wide range of pulverized materials, such as portland cement, limestone, clay and similar materials. It can convey portland cement at rates up to 300 bbl/hr, for distances up to 125'.

(Fuller-Kompact Model 62 pump is manufactured by Fuller Co., subsidiary of General American Transportation Corporation, Catasauqua, Pennsylvania.)

Check 1785 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



H-25 produces 20% more in tough digging

"We have been using PAYLOADER *equipment for years with satisfactory performance" . . . says Merchant Fertilizer Co. President M. J. Clement III. "Our H-25 is well into its second season. Lost time has been limited to less than one day. The H-25 is the ideal size . . . it's fast and has much more digging power than manual shift loaders. On dense material, the H-25 gains up to 20% more load-carry production."*

Merchant's Fertilizer Co. of Pensacola, Florida, manufactures commercial fertilizer under the brand name "MERCO" for distribution principally in northwest Florida, Alabama and Mississippi. They use PAYLOADER tractor-shovels almost exclusively for in-plant handling of ingredients. Their present fleet consists of four units of 2000-lb. operating capacity (Models HA and HAH) and a larger Model H-25 that combines a breakout force of 4500-lbs. with 2500-lb. operating capacity.

In operation, the H-25 averages unloading 5 rail cars, on a 75-ft. haul, in 8 hours and delivers material to the bagging operation at a rate of 450 tons in 10 hours. They credit this fine production performance to the H-25's superior basic design and such outstanding mechanical features as power-shift transmission, power-transfer differential and power steering with a short 6-ft. turning radius. In addition, the H-25 has extra protection against dust and dirt "built in" to insure against costly downtime.

Your Hough Distributor wants to show you how an H-25 can "boost production" in your bulk handling requirements. Contact him for a demonstration or return the coupon below.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY - INTERNATIONAL HARVESTER COMPANY

HOUGH, PAYLOADER, PAYDOZER, PAYMOVER, PAYLOGGER, PAYLOMATIC and PAY are registered trademark names of The Frank G. Hough Co.

THE FRANK G. HOUGH CO.
744 Sunnyside Avenue, Libertyville, Ill.

Send full data on the Model H-25 PAYLOADER

Name
Title
Company
Street
City State

11-A-4

"See our exhibit at the Chem Show"

Check 1786 opposite last page.

Whatever the operation—whatever the results you want—Ludlow-Saylor and Star can deliver the finest woven wire screen or cloth from stock, or precision weave it promptly to your most exacting specifications.

More than a century of technical know-how and the industry's most complete facilities are at your service.

L-S and Star Cloth and Screens are woven from stainless steel, Monel, bronze, copper, brass, high carbon and oil-tempered steel, and virtually any metal that can be drawn into wire.

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STAR WIRE SCREEN AND IRON WORKS, INC.
(L-S SUBSIDIARY) LOS ANGELES, 2515 SAN FERNANDO RD.

Check 1787 opposite last page.

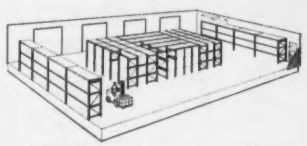
HANDLING & PACKAGING

Drive-in, drive-thru racks utilize all floor space

Uses: Racks for high-density storage of palletized items.

Features: Floor space may be completely covered by storage racks, even space normally allotted for internal aisles; yet lift trucks have full access to storage items.

Description: Components include vertical frames of welded 3"-square columns and 1-½"-square diagonal tie-members, rail support arm, and 3"-square support rails which hold pallet, plus ceiling supports and cross-bracing members. These pre-fabricated components are designed for custom installation to meet user's exact storage requirements.



Combined "drive-in" and drive-thru" installation

In "drive-thru" installations, support frames are arranged in parallel rows so that trucks can drive through any empty storage bay.

For "drive-in" installations cross-rows of support frames or bracing are arranged so as to prevent complete passage through bay, but allow lift trucks to place items by driving in and backing out.

(AIM racks are manufactured by Fabricated Materials Division, Acme Steel Company, 135th St., and Perry Ave., Chicago 27, Ill.)

Check 1788 opposite last page.

Built-in hydraulic lift feature of tumbler for 55-gal drums

Uses: Tumbling of 55-gal steel drums.

Features: Tumblers have built-in hydraulic lift for raising drum to proper height for clamping into position on the tumbler.

Description: A modification

Discharging granular materials into hopper.

~~CUT~~
handling costs
WITH
NEST-A-BIN®
bulk containers

KAISER NEST-A-BIN... for efficient shipping, handling and storage of liquid or granular materials... reduces labor costs, simplifies inventories. Bin designed for easy disassembly into two nestable half-sections for fast cleaning and inspection. Nesting also permits savings in space and shipping costs on return movement. NEST-A-BIN... in five sizes for liquids (220, 330, 440, 550 and 660 gal.), two sizes for granular (54 or 70 cu. ft.) in aluminum. For details, contact national distributors:
HOWARD TERMINAL CO., P. O. Box 857, Oakland 4, Calif.

KAISER INDUSTRIES

PHOTO COURTESY OF SHAWINIGAN RESINS CORP.

Pumping liquids from tank car into NEST-A-BIN, for direct delivery to consignee.

Check 1789 opposite last page.

of manufacturer's standard line of Figure 730 drum tumblers, they incorporate loading platform which can be raised and lowered under control of a three-way hydraulic valve. Drum to be clamped into tumbler is placed on the platform, inside the holding clamps. Platform is

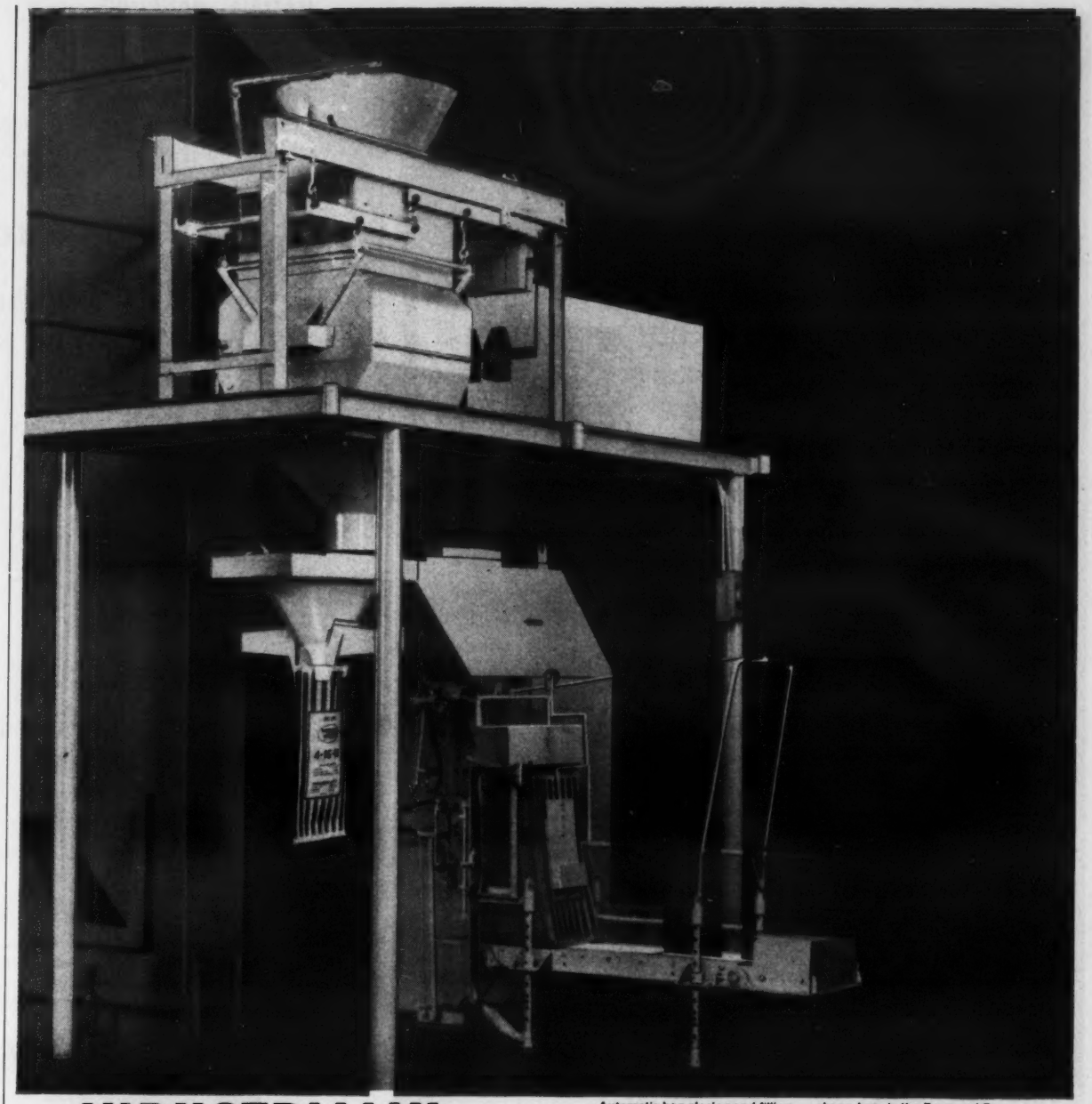
Hydraulic lift on drum tumbler takes manual work out of positioning steel drums into tumbler

then raised under power from a separate motor which operates the hydraulic system. When drum has reached proper level for clamping, the clamps are closed and locked around the drum. Platform is then lowered and drum rotated by main tumbler motor.

Lifts are available on both single and double drum tumblers.

(Hydraulic-lift drum tumblers are being introduced by Process Equipment Div., of U.S. Stoneware Co., Akron 9, O.)

Check 1790 opposite last page.



Automatic bag placing and filling . . . shown here is the Raymond Bag Packer (top half of photo) and the Raymond Bag Placer (bottom)

INDUSTRIALLY PROVEN... *the Raymond Combination*

ROTOMATIC BAG PACKER—BAG PLACER

Here's a proven step towards automating your packing line. The Raymond combination Bag Placer and Bag Packer will automatically hang bags on packing spout and fill them at the rate of 25 bags per minute . . . proven in full production line operation. The development of the Raymond Bag Placer, which is designed to operate with all open mouth packing equipment, is another step forward towards completely automatic bag placing, filling and closing operations. For details on the Raymond Packer Placer combination or separate units, contact your nearest Raymond Representative or write

Raymond BAG CORPORATION
Middletown, Ohio
A Division of Albemarle Paper Mfg. Co.

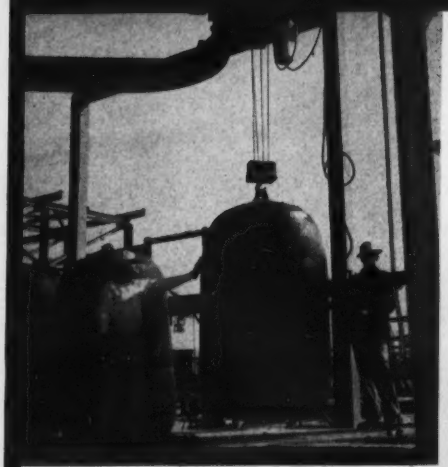
ATLANTA • BALTIMORE • CHICAGO • KANSAS CITY • LOUISVILLE • NEW YORK

Check 1791 opposite last page.

PROBLEM:

HANDLE ALUMINUM CHLORIDE
SAFER, FASTER, AT LOWER COST

"or other "problem" materials



Handling aluminum chloride, in U.S. Sealdbins, is a safe, fast one-man job with lift truck or crane. Storing is simple, inexpensive. Sealdbins are their own weather-proof warehouses.

U.S. Sealdbin Containers empty quickly, directly into a process conveyor. No loss of aluminum chloride. No risk of personnel injury.

SOLUTION:

USE PROVEN U.S. SEALDBIN CONTAINERS

Pictured above are U.S. Sealdbins handling aluminum chloride at the Baton Rouge Refinery of Esso Standard, Division of Humble Oil and Refining Company. Made of high-strength cord fabric and rugged synthetic-rubber compounds, Sealdbins are noncorrosive and moistureproof. They can be collapsed and returned in a fraction of their outbound space. Find out how much time, labor and money U.S. Sealdbin Containers can save for *you*. For latest U.S. Sealdbin facts, write, wire or phone

US RUBBER

TRANSPORTATION PRODUCTS DEPT.
United States Rubber
10 Eagle St., Providence, R. I., DExter 1-4000

Check 1792 opposite last page.

Self-amortizing in 2 years, bulk bins provide . . .

Salicylic-acid handling headache-free

Problem: Air-tight handling ranked high on the list of requirements in planning Hilton-Davis Chemical Company's new salicylic acid plant at Cincinnati, Ohio.

A NEW SOLUTIONS FEATURE

This division of Sterling Drug, Inc., processes the salicylic acid for intra-company, inter-divisional use. Some of it eventually is combined with acetic anhydride by Glenbrook Laboratories Division to form aspirin.

Among the characteristics of salicylic acid which make air-tight handling a "must" are: 1) dust can form an explosive mixture with air; 2) the crystals darken when exposed to light; and 3) salicylic acid is hygroscopic.

The plant planners considered using drums, a fairly conventional method of handling. However, these would require polyethylene liners, air-tight gaskets and would have to be fabricated of corrosion-resistant materials. Using drums would have meant multiple handling.

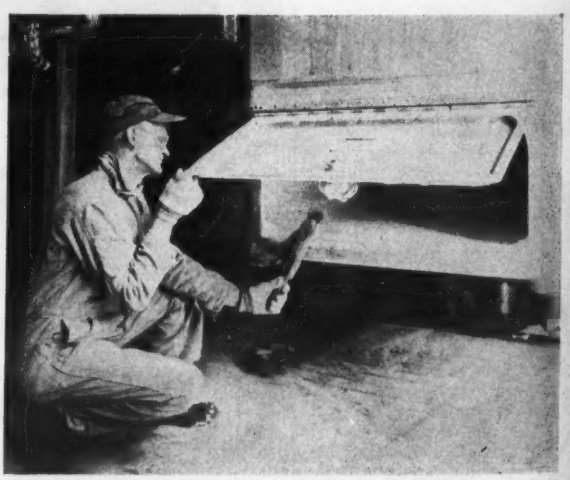
Conveyor systems were also appraised, but were ruled out because of initial cost.

Solution: A system of bulk handling which utilizes aluminum bulk containers, each capable of handling 3000 lb of salicylic crystals, was adopted. Here is how they fit into the operation.

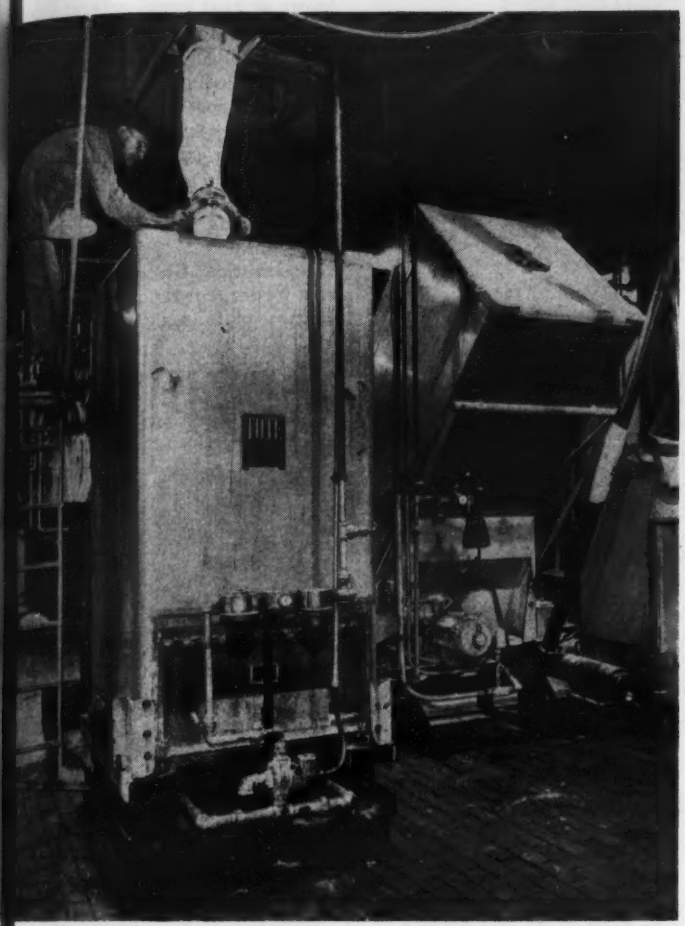
Following the initial drying operation, salicylic acid is fed into a bin mounted on a jolting mechanism. The jolting action packs the powder into the bin.

After a code number, batch number and weight have been marked on the filled bin, it is carried by walkie electric fork lift to the discharging area or to storage.

At the discharging area, the bin is placed on a tilting device which dumps the acid into a



Quick brushout of container to clean gaskets is only maintenance required to keep bin clean enough for handling USP-grade salicylic acid



Hilton-Davis employee hooks up nylon sleeve preparatory to filling a 98-cu-ft bin, which is mounted on jolter to pack salicylic acid. Bin at right is discharging on device which tilts bin to 45° angle to assure complete flow-out

link-chain conveyor and it is then processed into technical-grade salicylic acid.

Those crystals which were stored, are eventually taken to an adjacent purification building. There another tilt is used to empty them into a weigh bin from which they are fed into a dryer. This material is then vaporized, filtered, condensed and discharged into bulk bins. The end product from this operation is USP-grade salicylic acid, which is used in the manufacture of aspirin.

Results: One man takes care of the handling operation, filling the bins, moving them to storage and to additional processing operations.

Ten to 15 drums would have been required to handle the same amount of acid as is now accommodated by one bin. A bin can be positioned, filled or emptied, and removed in five minutes as compared to 60 minutes for drums with equivalent capacity.

There is no product loss in dumping and housekeeping is minimized. Hilton-Davis officials expect savings in labor, maintenance and housekeeping to pay for the bins in 2 yrs.

(Tote Bins, Tote Tilt and Tote Jolter are manufactured by Tote System, Inc., Beatrice, Nebr.)

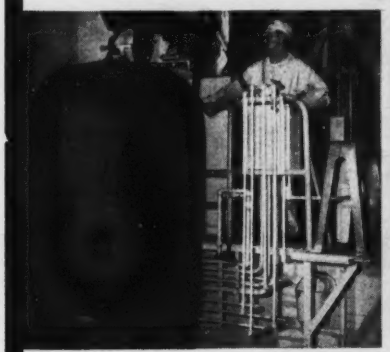
Check 1793 opposite last page.

PROBLEM:

HANDLE SARAN RESIN IN BULK WITHOUT DANGER OF CONTAMINATION

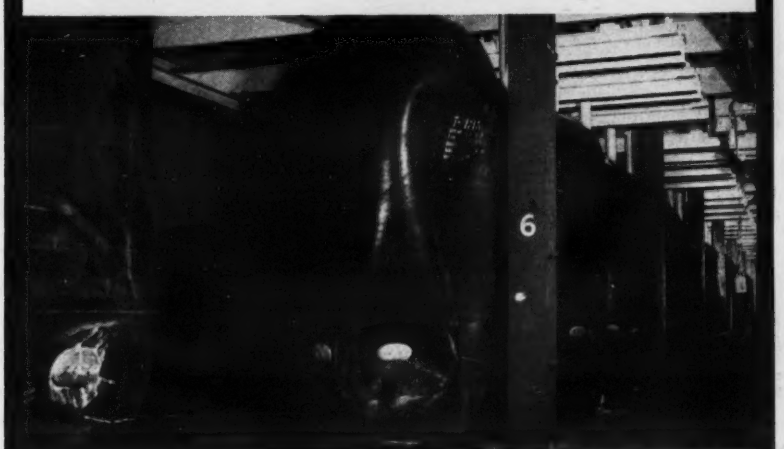
SOLUTION:

USE PROVEN U. S. SEALDBIN CONTAINERS



Loading Saran into U.S. Sealdbins in a completely closed system guarantees protection from outside contaminates.

Rugged U. S. Sealdbins are their own weather-resistant, hermetically sealed warehouses — unaffected by exposure.



Transferred indoors, U.S. Sealdbins are unloaded in a completely closed system. From filling, to storage, to emptying, Saran Resin remains free of contamination.

Pictured above, U.S. Sealdbins are handling Saran Resin at Dow Chemical Company's Midland, Michigan, plant. Made of high-strength cord fabric and custom-compounded synthetic rubber, U.S. Sealdbins are rated tops in weather and corrosion resistance. Collapsible, they can be returned in but a fraction of their outbound space. Find out how much time, labor and money U.S. Sealdbins can save in your operation. Write, wire or phone

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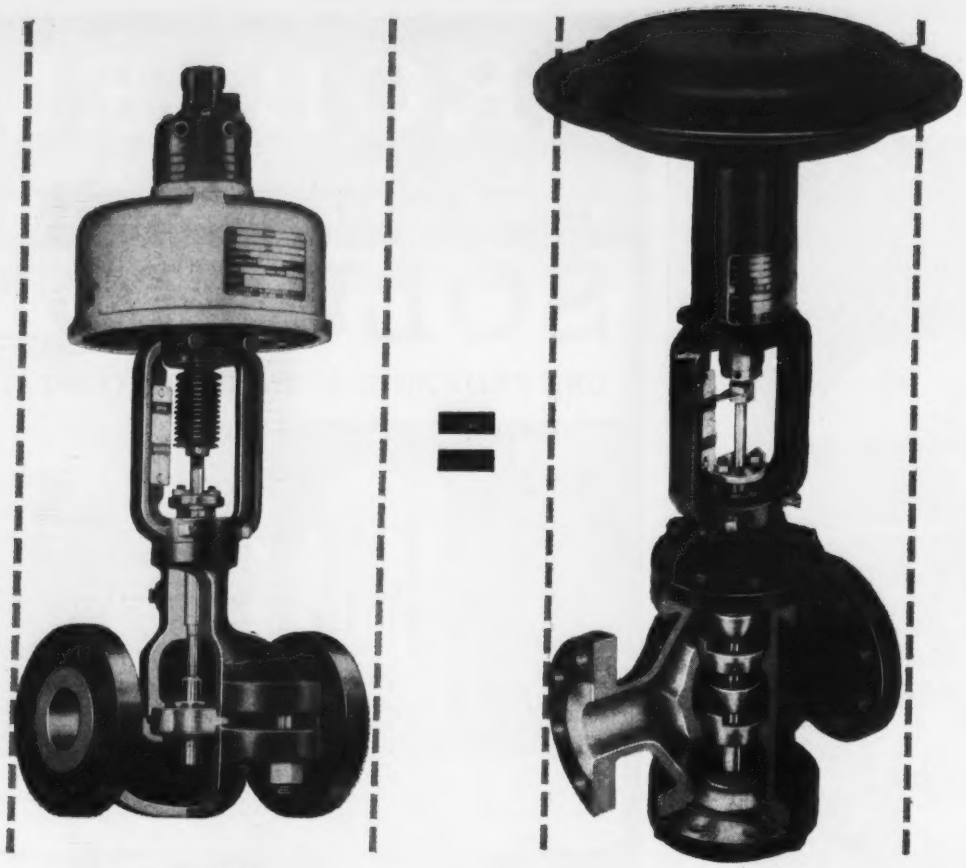
Check 1794 opposite last page.



"FIT" Companions

reduce costs . . . increase valving flexibility

With face-to-face dimensions to I.S.A. standards, K&M split body valves are interchangeable with K&M regular globe-body diaphragm valves (and with all standard makes of diaphragm valves).

This *exclusive* feature of the K&M split body design enables you to make significant reduction in your plant inventory investment of replacement valves. It gives you highly desirable flexibility.

Additional flexibility is provided in the K&M split body valve itself. Interchangeable. unitized construction makes it possible to develop 432 different valve combinations from a single split body.

In a matter of minutes you can make the body reverse or direct-acting; switch the operator to dome, diaphragm, or handwheel; change the seat ring to one of several types; recharacterize by selecting a different plug; substitute the replaceable, rotatable flanges; convert from globe to angle type.

The K&M split body valve fits your existing piping and fits your budget.

One more plus . . . K&M split body valves have the largest C_V offered in split body construction . . . more flow for your money.

Write for Catalog 132 completely describing the valve that brings the split body idea to its fullest development.

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64 Genung Street, Middletown, New York

B.A. 1697

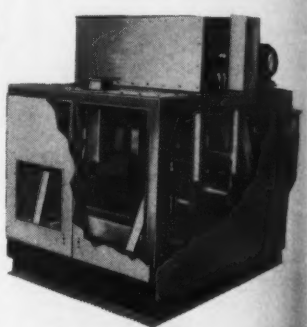
Check 1795 opposite last page.

Continuous weigh feeder holds preset feed rate of ½ to 50 ton/hr

Uses: Feeding bulk materials at high speed and accuracy.

Features: Automatically maintains a preset feed rate of ½ to 50 ton/hr. Entire system is enclosed in a dust-tight housing with dust collection vent.

Description: System consists of a feeder, conveyor belt, and flexure plate scale. Belt and



Continuous weighter is shown equipped with rotary feeder for powdered materials

its structural components, especially designed to prevent dust and material accumulation, are completely suspended from the scale.

Several feeder types are available, including a rotary feeder and vibrating types.

Instrumentation for completely automatic operation is housed in a separate control box. The system is capable of regulating ratio-type controllers and of proportioning several ingredients to a process flow. Weight setting controls at the scale housing permit selection of a wide range of flow rates. A totalizer indicates lb/hr (or tons) and summation of a day's run.

(CM12 feeder system is a development of Thayer Scale Corporation, 1 Thayer Pk., Pembroke, Mass.)

Check 1796 opposite last page.

Automatic labeler and imprinter for use with flexible envelopes and rigid containers is introduced in Bul AL-1 — Avery Label Co.

Check 1797 opposite last page.

CHEM SHOW highlight

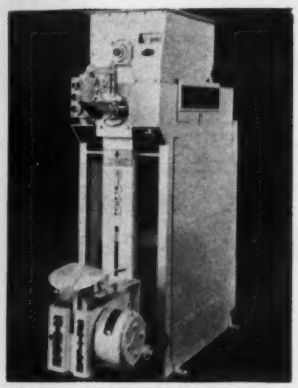
Speed, accuracy features of air-pressure packer

Installation head room as little as 87½"

Uses: Packaging of powdered, flaky, granular or pelleted materials.

Features: Packer is equipped with true-scale beam that has 100-to-1 scale leverage which provides sensitivity of as little as ¼ oz actuation of an electronic sensing capacitor. It functions without direct electrical connections, thus avoiding sparking.

Description: Essentially an adaption of manufacturer's DX



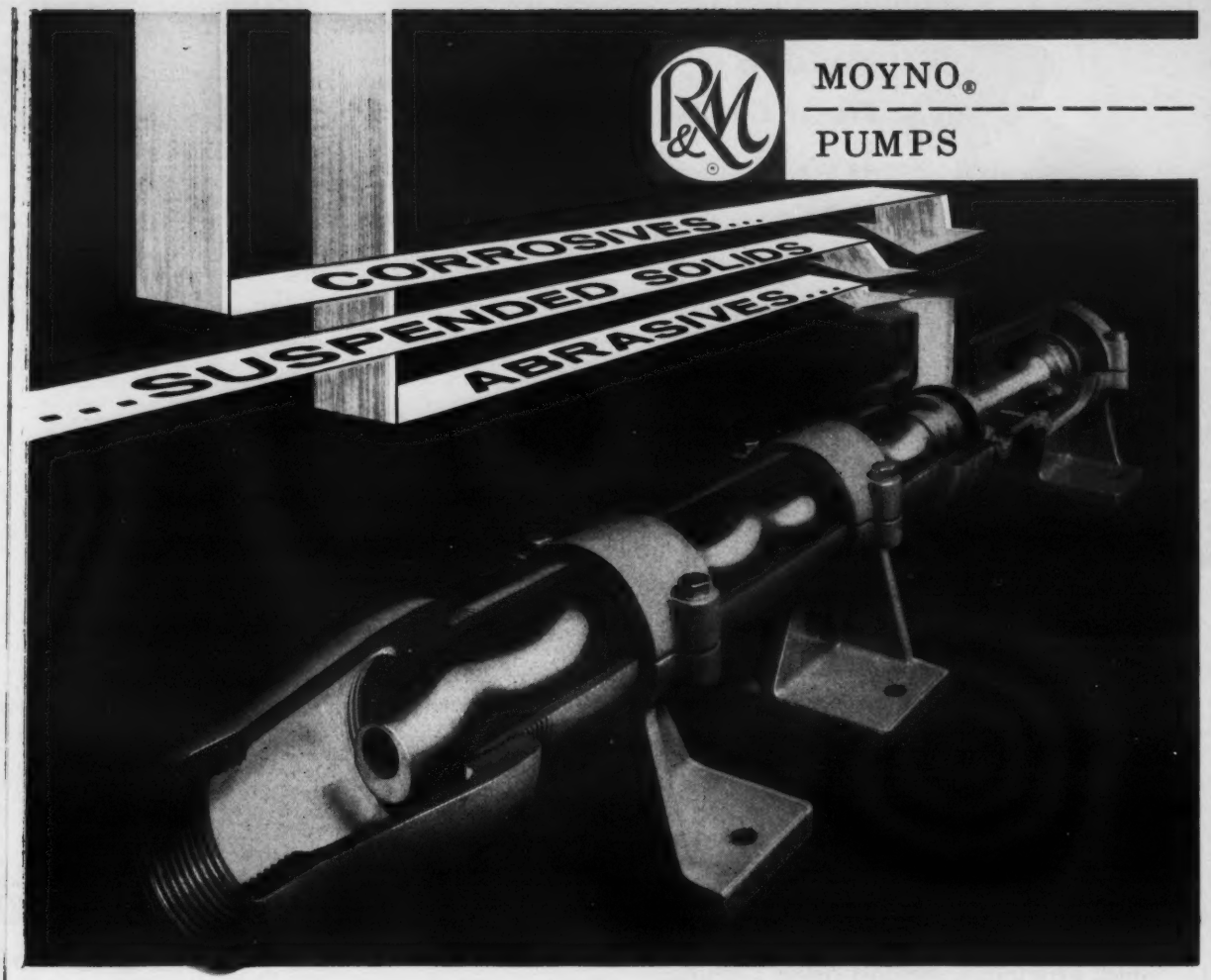
Valves and controls of air-pressure packer are designed from the operator's viewpoint so that they may be easily seen and reached

model and its weight control system, packer is equipped with air pressure delivery system.

Installation head room is only 10' 8" on standard model. This can be reduced to 87½" with an optional pressure chamber. Quick interchangeability of hoppers and feed systems to accommodate different materials increases versatility and potential uses of machine.

(Stok-Aire packer is being introduced by The H. L. Stoker Company, Claremont, California.)

Check 1798 opposite last page.



MOYNO® *solves tough pumping problems!*

Moyno's "progressing cavities" successfully handle thin watery slurries, non-pourable abrasives, gnawing corrosives or suspended solids up to 1⅛" dia.—without crushing, foaming or aerating! Material contacts only one moving part, a screw-like rotor revolving in a double-threaded stator. Where corrosives or abrasives are to be handled, rotor and stator are made of special resistant materials that minimize maintenance and prolong pump life. Many materials now pumped by Moyno were once considered "unpumpable" . . . had run up prohibitive maintenance costs on other type pumps or ruined them completely!

Moyno pumps are available in capacities to 500 gpm; pressures to 1000 psi. Learn more . . . write today for new Bulletin **100-CP!**

Moyno's unique pumping principle . . . as the hand turns the rotor . . . flow is right to left.

ROBBINS & MYERS, INC., Springfield, Ohio

Fractional and Integral HP Electric Motors • Electric Hoists and Overhead Traveling Cranes • Moyno® Industrial Pumps
Propellair® Industrial Fans • R & M-Hunter Fans and Electric Heat • Trade-Wind Range Hoods and Ventilators
Subsidiary companies at: Memphis, Tenn., Pico Rivera, Calif., Brantford, Ontario.

"See our exhibit at the Chem Show"
Check 1799 opposite last page.

Comparison of Toteline molded fiber glass tray, left, and metal tray, right, at American Cyanamid Co. shows how corrosive chemical intermediates have eaten holes in metal tray. Fiber glass tray is unaffected.

Savings of about $8,000 a year were reported by American Cyanamid Co. after plants at Boundbrook, N.J., and Willow Island, W. Va., introduced 1,000 Toteline trays for handling dye intermediates, pigments and corrosive chemicals.

Toteline trays replaced enameled steel trays which were fragile, required special handling, chipped, flaked and caused contamination. Replacing steel trays cost $16,000 a year.

Toteline trays cut replacement costs in half, saving $8,000 a year. They resist non-oxidizing acids, corrosive salts, weak alkalis and many other chemicals. They are lighter than aluminum, do not rust or chip. The smooth, uncoated surfaces do not contaminate contents and the trays are stronger than steel on a strength-weight basis.

If your company wants to make savings like American Cyanamid, investigate what Toteline trays can do for you. Just clip, fill in and mail the attached coupon for further information.

by TOTELINE

MOLDED FIBER GLASS TRAY CO., LINESVILLE, PA.

World's Largest Producer of Reinforced Plastic Trays and Tote Boxes

Please send further information on trays for chemical processing.

Briefly, we use trays (or boxes) to_____

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_____ Approximate size range_____

Name_____ Title_____

Company_____ Address_____

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MF 4-CP

Check 1800 opposite last page.

NEW LITERATURE

Material Handling and Packaging

Container utilization to save man hours and facilitate production for manufacturers can be analyzed with help of Evaluator — Chicago Mill and Lumber Company.

Check 1801 opposite last page.

Re-designed net weigher which accommodates up to sixteen 50-lb bags/min of polyethylene cubes is subject of Application Report 219 — Richardson Scale Company.

Check 1802 opposite last page.

Code system for designating manufacturer's cellophane types enables packagers to compute unit packaging costs by simple and direct method. Three digit code numbers in front of letter designations of films are, under new system, directly related to yield — number of square inches/lb expressed in hundreds. Code is introduced in Price List 32 — Film Division, American Viscose Corporation.

Check 1803 opposite last page.

Technical data on sizes, styles and types of steel pails and drums is made readily available with graphic device resembling circular slide rule. Device quickly shows nearest supply source and other information pertinent to container users. Container Locater — Vulcan-Associated Container Companies, Inc.

Check 1804 opposite last page.

Casters and wheels, made of polyurethane elastomer to resist solvents and acids, are illustrated in Cat CW-61 — Saginaw Products.

Check 1805 opposite last page.

Casters, both swivel and rigid, equipped with polyurethane tread wheels are presented in Cat 150 — Hamilton Caster & Mfg. Co.

Check 1806 opposite last page.

Bottle uncaser changes over to fit many different cases or bottles in 15 min. Bul FD101 — Geo. J. Meyer Mfg. Co.

Check 1807 opposite last page.

Checkweigher, for cases and bags between 25 and 150 lb, permits uninterrupted flow on powered conveyors. Bul 3376 — Exact Weight Scale Co.

Check 1808 opposite last page.

Bulk adhesive handling systems for usages over 10,000 lb per month are diagrammed in four-page Tech Bul GL-5 — Adhesives and Chemicals Division, The Borden Chemical Co., Department H.

Check 1809 opposite last page.

NEW CURVE CROWN® ONE PIECE ALL STEEL PULLEYS

STEPHENS ADAMSON

FEATURING EXCLUSIVE "SPUN END" CONSTRUCTION

PATENTED

"SPUN END" CONSTRUCTION—Eliminates weldments in areas of high stress concentration, a major source of fatigue, warping and trouble. "Spun End" construction allows the placement of maximum metal thickness at end plate bore reducing unit pressures of radial loads while providing thin plate flexibility to accommodate shaft deflections.

CURVE CROWN DESIGN—Accurately formed CURVE CROWN on outer ends of rim eliminates conventional center peak—a high point for belt stretch and wear—while increasing belt training effect more than 100%.

SQUEEZE LOCK HUB—Design effectively transfers loads from rim to hub and from hub to shaft. Hub provides for full torque transmission without the use of keyways and eliminates distorting loads against pulley "Spun End." The SQUEEZE LOCK Hub exerts locking forces in two directions—to both shaft and pulley end plates—through a self-contained hub.

S-A

WRITE FOR BULLETIN 1160

PRODUCTS DIVISION

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PLANTS LOCATED IN:

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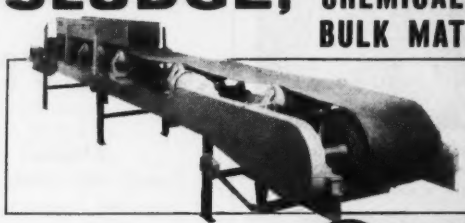
Check 1810 opposite last page.

SPECIAL CONVEYORS for HANDLING SLUDGE, CHEMICALS, AND BULK MATERIALS



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Permanent or Portable in a Wide range of sizes

Here's your answer for handling *sludge*, chemicals, and bulk materials. This line of permanent or portable trough conveyors is designed for long service . . . low operating cost. Ask for full details.

Send for Bulk Handling Portfolio. Complete line of machines for chemicals, fertilizers, powders, aggregates and many other bulk materials. Get your copy today!

BULK HANDLING CONVEYORS

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STAINLESS
STEEL service
NINE WESTERN WAREHOUSES
ESCO®

Specialists for
EVERY service in

STAINLESS STEEL!

SPECIALISTS in stainless steel exclusively.

SPECIALISTS in meeting *your* requirements for stainless sheet, plate, tube, pipe, bar, rod, wire, billet, valves, fittings, fastenings, or PVC.

SPECIALISTS in making *your* deliveries promptly from the convenient stocks in nearby warehouses.

For Example: *ESCO* can furnish everything you need in PVC and UPVC pipe, valves, tubing, sheet, flanges, fittings, fastenings, solvents and adhesives. Plastic lined pipe, tubing and fittings are also available.

SPECIALISTS in metallurgical know-how equipped with industry's most modern laboratory facilities to help solve *your* special problems.

SPECIALISTS in producing *your* stainless and high alloy steel castings.

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2475 N. W. Vaughn St...CApitol 6-7341

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630 South Queen Street.....583-689

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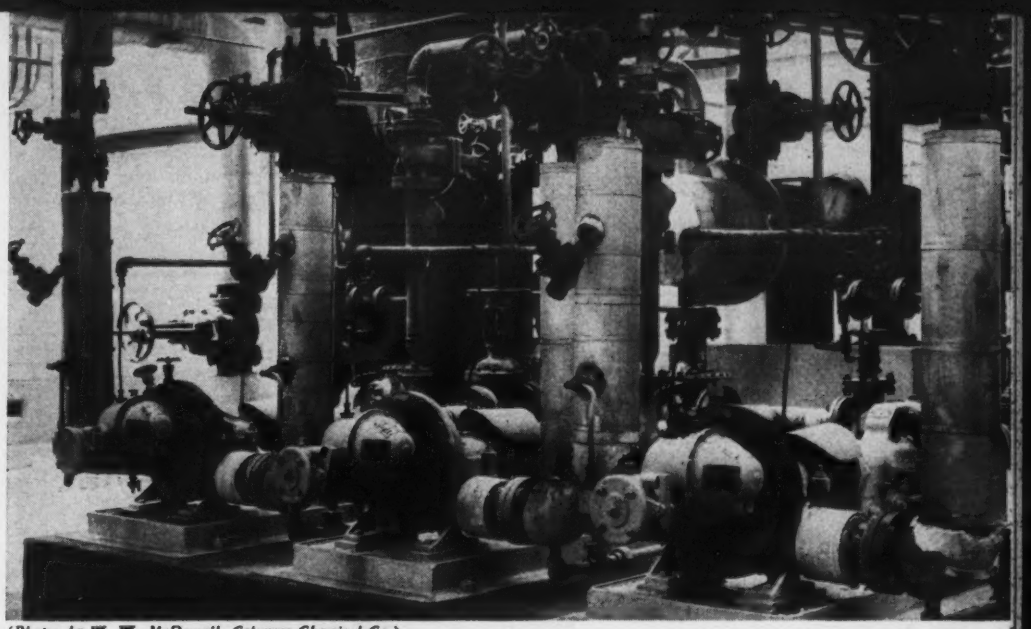
8425 Ontario Street.....FAirfax 5-2288



Steam turbines, shown driving pumps in this installation, have required minimum maintenance

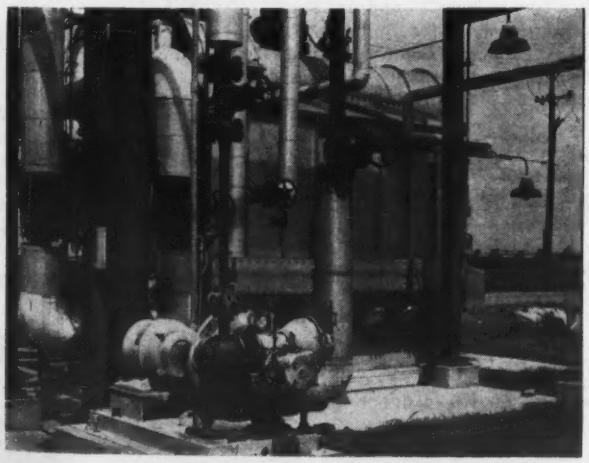
(Photos by W. W. McDowell, Celanese Chemical Co.)

Flexibility major advantage of 700 steam turbines at Celanese

Variable-speed units operating at 240 psig furnish exhaust steam at 40 psig for process

By R. E. GAUTREAUX, P.E., Director of Engineering
Celanese Chemical Co., Div. of Celanese Corporation of America
With CP Staff

Steam-driven turbine drives generator for emergency instrument power. Turbines serve as dependable standby source of power in event of power failure. They can be started up instantly, needing no warm-up



PRINCIPAL reason that more than 700 steam turbines, varying in size from 1 to 130 hp, were selected for use in the Celanese plant at Bishop, Texas, is the flexibility they provide. For example, although most of the turbines are driven by 240-psig steam, they act as reducing valves to supply 40-psig steam for process.

A NEW SOLUTIONS FEATURE

Operating experience shows that the steam turbines have low maintenance costs, particularly since the installation of a mist lubrication system throughout most of the plant.

Fig 1 shows a typical installation of turbines as pump drivers. An unusual application of a turbine is illustrated in Fig 2. Driving a generator to supply emergency instrument power for a small heater shown in the background, the turbine is driven by 40 psig steam exhausting to 5 psig. At this installation, advantage is taken of turbine drives to handle the demand for exhaust steam for process heating.

A number of areas in this plant are classified by the National Electric Code as Class I, Group D, Division 2, where explosive atmospheres may exist at times. Turbine drives meet the requirements of the code.

In other applications, steam turbines are efficient and dependable prime movers where there might be a possibility of power failure. The units that are kept warm can be started up instantaneously and, therefore, are useful as stand-by prime movers.

For those applications where flexibility is needed for speed and load conditions, a turbine works out well. Variable speed is accomplished easily and the turbine may be applied to such equipment as blowers and fans, dryers, wet or dry mixers, and many other applications. This type of drive is not limited to steam as a power-producing medium; compressed air and natural or process gas may also be used.

Steam turbines are equipped with a constant speed, fly-ball or fly-weight-type, centrifugal

governor. A low-speed governor head is driven directly from the turbine shaft through a worm and gear to the governor head. The worm-gear set and governor head are fully enclosed.

A constant-speed governor is provided with a hand-speed changer, allowing adjustment of turbine speed while the turbine is in operation. Normally, the governor is furnished for a speed range of about 5% above and 20-25% below the specified operating speed.

The governor head acts directly on the stem of the steam-admission valve. Governor design provides long travel of the valve for a given variation of load or steam pressure to provide good speed regulation. An excess speed safety trip is provided to shut off the steam supply to the turbine in case there is a tendency to over speed.

Normally, the safety trip is adjusted to shut the turbine down at a speed of about 15% above the normal operating speed.

(Coppus turbines, furnished in six frame sizes, are manufactured by the Coppus Engineering Corporation, Worcester, Mass.)

Check 1813 opposite last page.

Steam-line connections not hard to find on pump

A completely steam-jacketed acid pump will handle any solution which freezes above ambient temperatures . . . such as ammonium nitrate, liquid sulfur and asphalt.

Multiple steam-line connections are provided on the case, case plate and stationary seal-ring housing. In use, any two connections on each jacketed part are connected to the incoming and return steam lines. The steam connections are tapped for ¾" pipe.

(Steam-jacketed acid pumps are product of A. R. Wilfley and Sons, Inc., Box 2330, Denver, Colo.)

Check 1814 opposite last page.

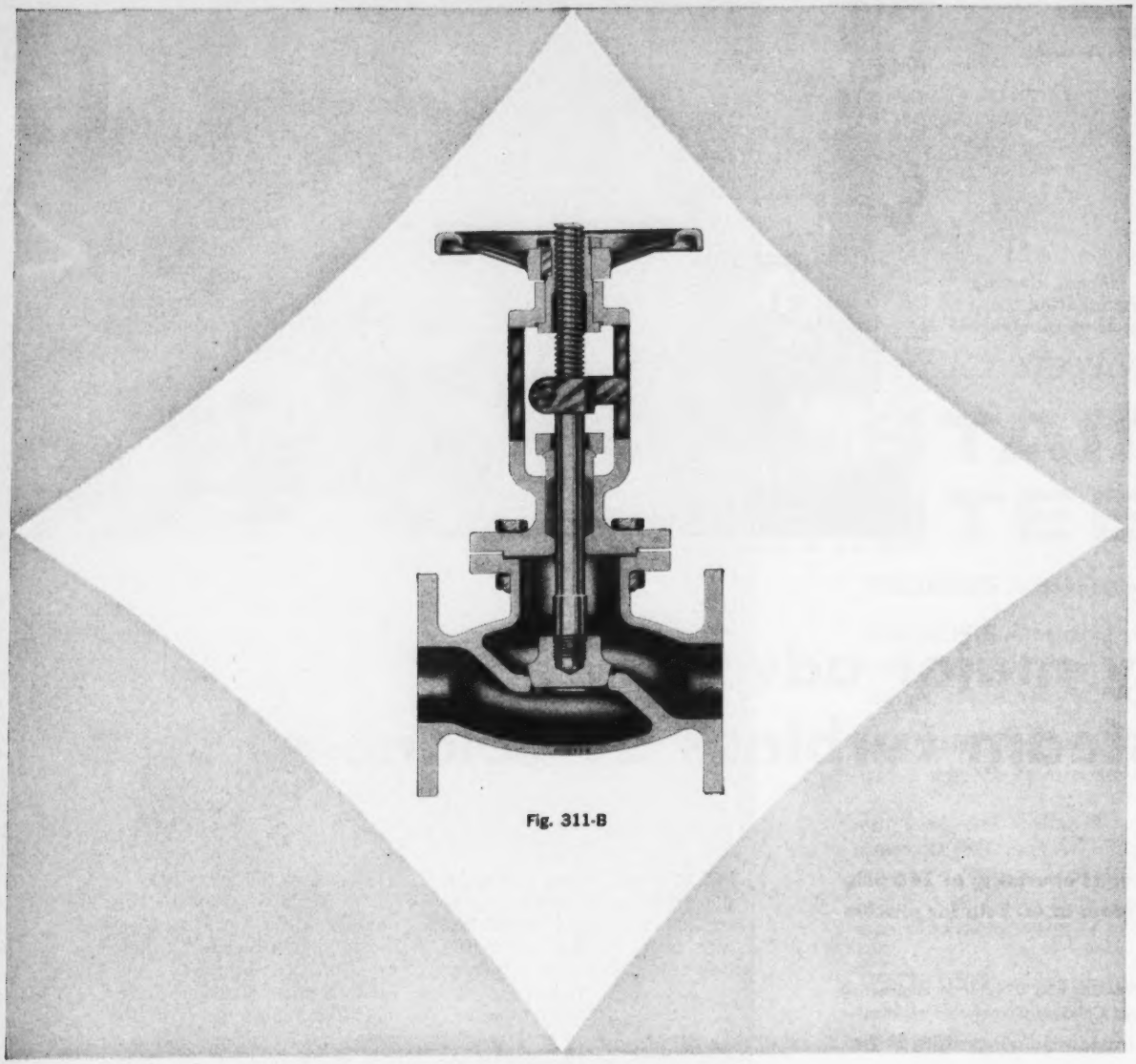


Fig. 311-B

Do you know the advantages of the new Aloyco Globe Valve design?

The design of 150 lb. globe valves of sizes 2" and larger features a non-rotating stem, non-rising handwheel with disc assembly pinned to the stem. This is accomplished by rotating the handwheel and yoke bushing assembly and preventing stem rotating by adding a stem key which fits into the bonnet yoke. The major advantages of the new design result in:

- No spiral wear pattern on stem from hardened packing or hard deposit in stuffing box.
- Rapid visual check of throttling control by observing location of stem stop.
- No galling of back seat because of rotating stem.
- No galling between seat and disc.
- Stronger disc to stem connection.
- No spinning of disc.
- Less corrosion attack because of elimination of cavity between stem and disc.

These new design advantages are available in stainless steel and corrosion resistant alloys in sizes 2" and up. For full information write for Bulletin #7, Alloy Steel Products Company, Inc., 1302 West Elizabeth Avenue, Linden, New Jersey. O.11

Longer Lasting ALOYCO VALVES 18-8 IN CORROSIVE SERVICE

Subsidiary of

ALLOY STEEL PRODUCTS COMPANY

Boston • New York • Wilmington • Atlanta • Birmingham • Baton Rouge • Buffalo • Pittsburgh • Chicago • St. Louis • San Francisco • Los Angeles • Seattle

Come visit us at Booth 22 at the Chemical Show

Check 1812 opposite last page.

CHEM SHOW highlight

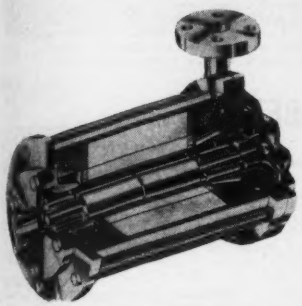
Motor pumps are devoid of seals, packings, stuffing boxes

Stationary field windings are fully protected

Uses: Primarily for general chemical service.

Features: Pumps have no seals, packings or stuffing boxes. Stationary motor field windings are fully protected against wetting of the pumped liquid by complete encapsulment of a plastic or resin.

Description: Seal-less end-suction centrifugal motor pumps can handle most fluids without use of a non-magnetic



Stationary field windings in seal-less motor-pump are protected against wetting by pumped liquid by complete encapsulment of a plastic or resin

cylindrical liner to separate fluid from the stator windings, since a non-metallic pump chamber is formed by encapsulment of the stator windings.

Pumps are available in ratings of 1 to 7½ hp. Operating temperatures in standard designs reach to 350°F, and models can be furnished on order for temperatures to 450°F.

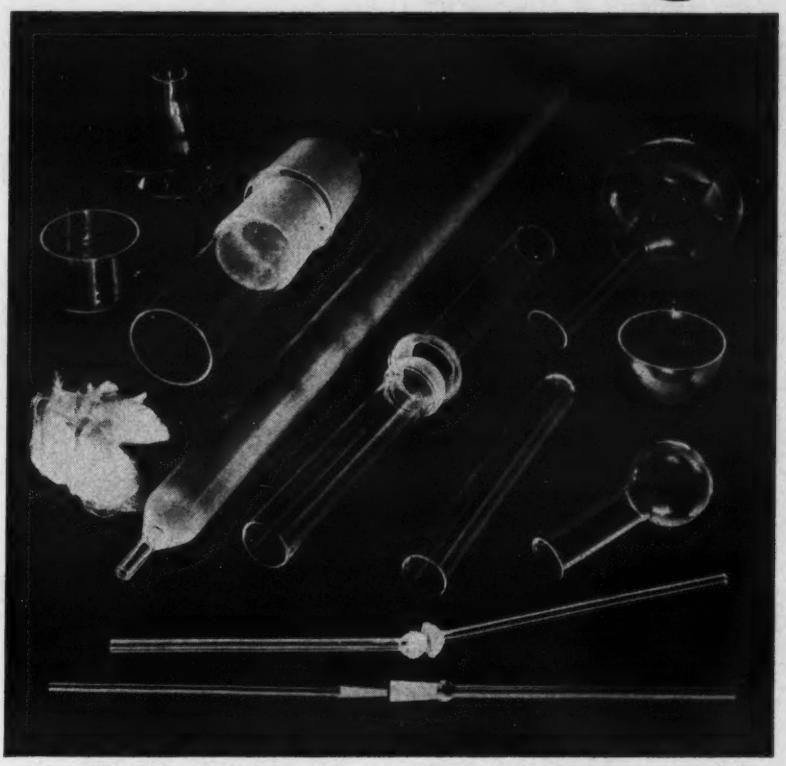
(Hydratomic Motor-Pumps are product of Alsop Engineering Corporation, Milldale, Connecticut.)

Check 1815 opposite last page.

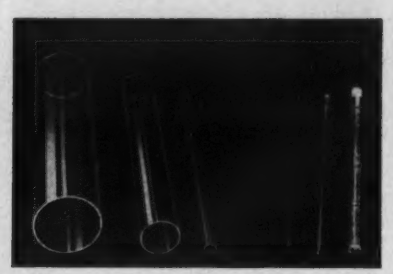
For more information on developments in this section, check the Reader Service Slip.

GENERAL ELECTRIC

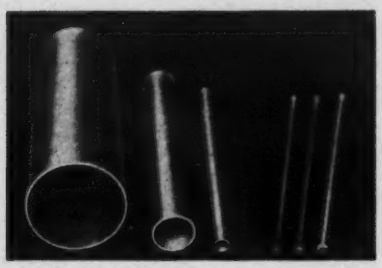
Fused Quartz



FUSED QUARTZ COMPONENTS FABRICATED of high purity—in stock in a wide variety of crucibles, boats, test tubes and furnace tubes.



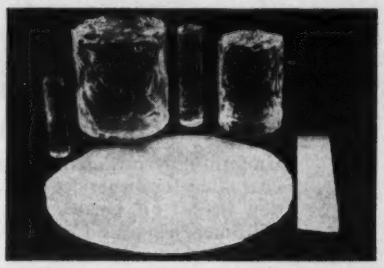
CLEAR TUBING AND ROD—Can be secured from stock in a complete range of sizes—special sizes also available to meet your exact specifications.



TRANSLUCENT TUBING AND ROD—*In stock* for immediate delivery in a wide range of sizes. Available in random or cut lengths to fit your requirements.

GENERAL ELECTRIC MANUFACTURES AND STOCKS A COMPLETE RANGE OF:

- Standard Taper Joints
- Capillary Tubing
- Double Bore Tubing
- Ball and Socket Joints
- Precision Bore Tubing
- Combustion Tubes
- Laboratory Quartzware



INGOTS, PLATES AND DISCS—Rough-cut *or* ground and polished in diameters up to 18½". Lenses, windows, prisms supplied *in a wide range of sizes*—or finished to your needs.

FREE BROCHURE ON G-E FUSED QUARTZ. Newly published 40-page brochure is yours for the asking. Contains latest information on physical properties and transmission characteristics plus complete prices. For your free copy of this illustrated booklet, or requests for engineering assistance, write the G-E Willoughby Quartz Plant (see "Midwestern" address below).

GENERAL ELECTRIC DISTRICT SALES OFFICES

New England
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DEcatur 2-6200

Midwestern
Euclid Ave. & Campbell Rd.
Dept. CP-111, Willoughby, O.
WHitehall 2-9300

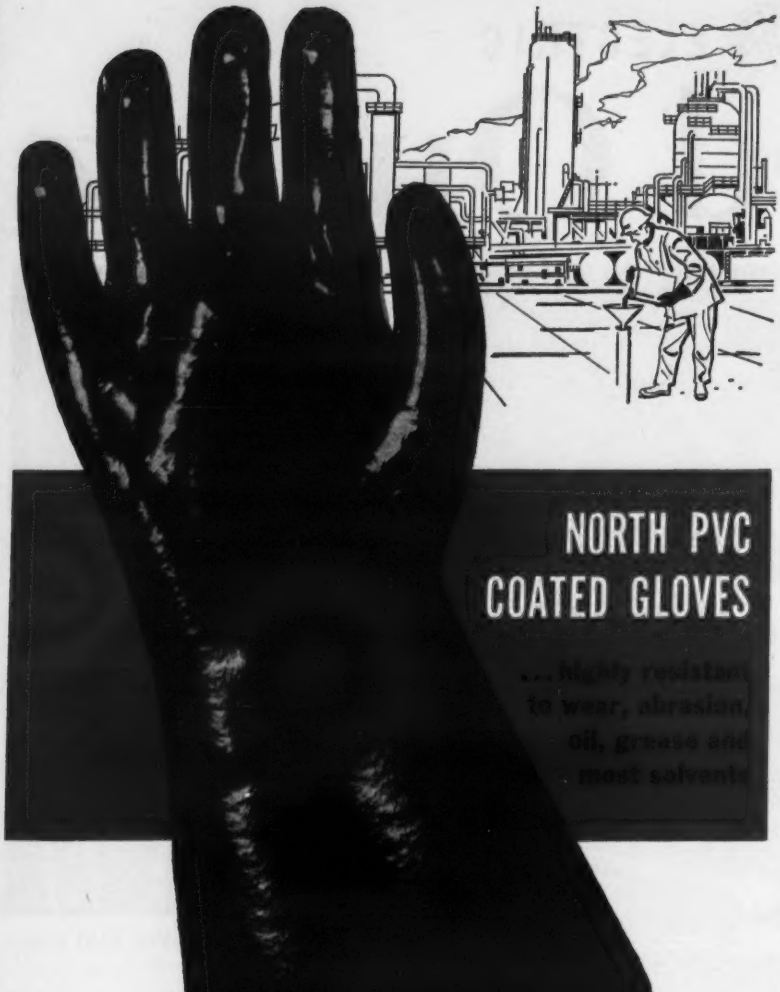
Eastern
744 Broad St.
Newark 2, N. J.
MArket 3-3953

Western
2747 S. Malt Ave.
Los Angeles 22, Calif.
RAymond 3-2541

Progress Is Our Most Important Product

GENERAL ELECTRIC

"See our exhibit at the Chem Show"
Check 1816 opposite last page.



Uniform polyvinyl chloride coating over thin liner offers longer service and superior protection against oil, grease, most acids, solvents and other chemicals. Coating is flame resistant and nonoxidizing, will not crack or peel, is extremely flexible. Thin liner absorbs less water, permits easier laundering. Gloves are shaped and sized to fit the hand, thus providing greater dexterity, more comfort. Write for complete information and literature.

To keep workers dry and comfortable in foul weather and to give them superior protection against chemicals, oils and greases—insist on North PVC Protective Clothing.

WRITE TODAY FOR LITERATURE DESCRIBING THESE PROTECTIVE PRODUCTS BY JOMAC

JOMAC Jomac Inc., Dept. N
Philadelphia 38, Pa.

In Canada: James North Canada Company Ltd., Simcoe, Ont.

"Jomac Sells Quality . . . and Quality Sells Jomac!"

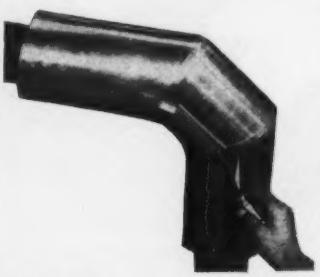
Check 1817 opposite last page.

Twisting, turning pipe is jacketed in stride with straight lengths

A new technique in applying jacketed pipe insulation permits job-site fabrication of aluminum-covered elbows, turns, sweeps and bends directly from straight lengths.

These are available for use with pipe sizes in ¾ to 24" range. They allow application of jacketed insulation in many cases where it was not possible formerly except on straight runs.

Fabrication and insulation for a fitting requires only a few steps, using a straight length of jacketed insulation being used for straight runs, an ordinary saw, a pre-formed band and a banding wrench.



Use of a special pre-formed band permits application of jacketed pipe installation on elbows, turns, sweeps and bends directly from straight lengths

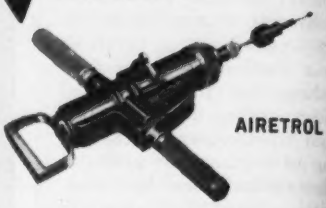
(Miter-Seal and Metal-On insulation system is product of Insulation Division, Johns-Manville, 22 East 40th Street, New York 16, New York.)

Check 1818 opposite last page.

There's gold in those old cylinders

Cash prizes of $100.00 each are being offered by Hanna Engineering Works to the finders of the three oldest Hanna-made hydraulic or air-powered cylinders still in service. Entries must be submitted by November 30, 1961, to Hanna Engineering Works Search Contest, 1765 N. Elston Ave., Chicago 22, Ill.

✓FASTER...

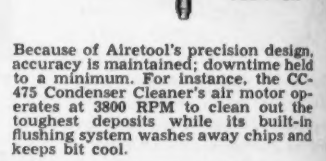


Typical of the speed with which tube maintenance and fabrication can be accomplished is the performance of the Airetrol automatic expansion control. Easy to operate . . . one man can roll 12 tubes a minute to .001" accuracy. Fast micrometer setting, convenient roll throttle, quick change chuck and rugged air motor combine to step up tube maintenance with accuracy.

✓BETTER...

Because of Airetool's precision design, accuracy is maintained; downtime held to a minimum. For instance, the CC-475 Condenser Cleaner's air motor operates at 3800 RPM to clean out the toughest deposits while its built-in flushing system washes away chips and keeps bit cool.

✓AT LOWER COST...

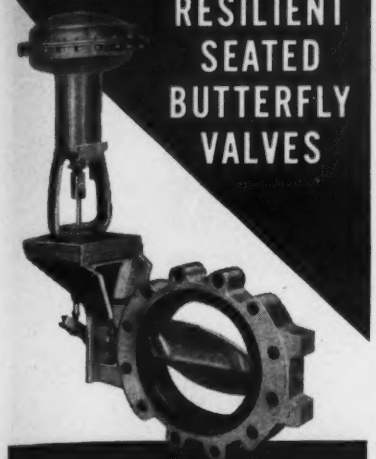


Representative of the low-cost operation of Airetool's complete line of pneumatic tools for maintaining and fabricating tubular equipment for heat exchangers, condensers, etc. Powerful, lightweight air motor speeds work, gets equipment back into service faster.

Airetool also makes a full range of brush heads and other type cleaners for straight or curved tubes and, in addition, a complete line of production tools and grinders. Write for a free demonstration in your plant.

Check 1819 opposite last page.

ROCKWELL
RESILIENT SEATED BUTTERFLY VALVES



SAVE

SPACE
Face-to-face width is less than one-third the pipe size.

WEIGHT
60 to 80% less than that of gate valves, depending on size.

COST
Less than other types in original outlay and maintenance.

TROUBLE
Shut-off is leak-tight against pressure or vacuum. Seat liner renewable.

Available with manual or automatic control for full range of pressures and other flow conditions.

- LOW PRESSURE DROP
- NO FOULING
- SELF-CLEANING
- SIMPLE CONTROL

Write for Bulletin 590X.

W. S. ROCKWELL COMPANY
2200 Eliot St. • Fairfield, Conn.
Made and sold in Europe by
COCKBURNS, Ltd., Glasgow S.W.2, Scotland

Check 1820 opposite last page.

Chemical Boobytraps

Unsuspected hazards awaiting the unwary

Wrongly told temps nearly disastrous

Temperature instruments which draw thermocouple current require thermocouples of a specific resistance in order to read correctly. If the length of the lead or the size of the lead is changed (as frequently happens when leads are relocated), the instrument requires recalibration.

Three "near misses," one involving the overheating of a reactor containing hydrogen at 2000 psi, occurred recently because temperature indicators had been relocated and the change in effective circuit resistance of the instrument had not been noted.

To correct this problem, plastic laminated tags were attached to all the instruments of this type:

Caution: This instrument draws thermocouple current. Therefore it must:

1) Use thermocouples of specified resistance.
2) Not be calibrated with a standard potentiometer.
3) Not be paralleled with other equipment.

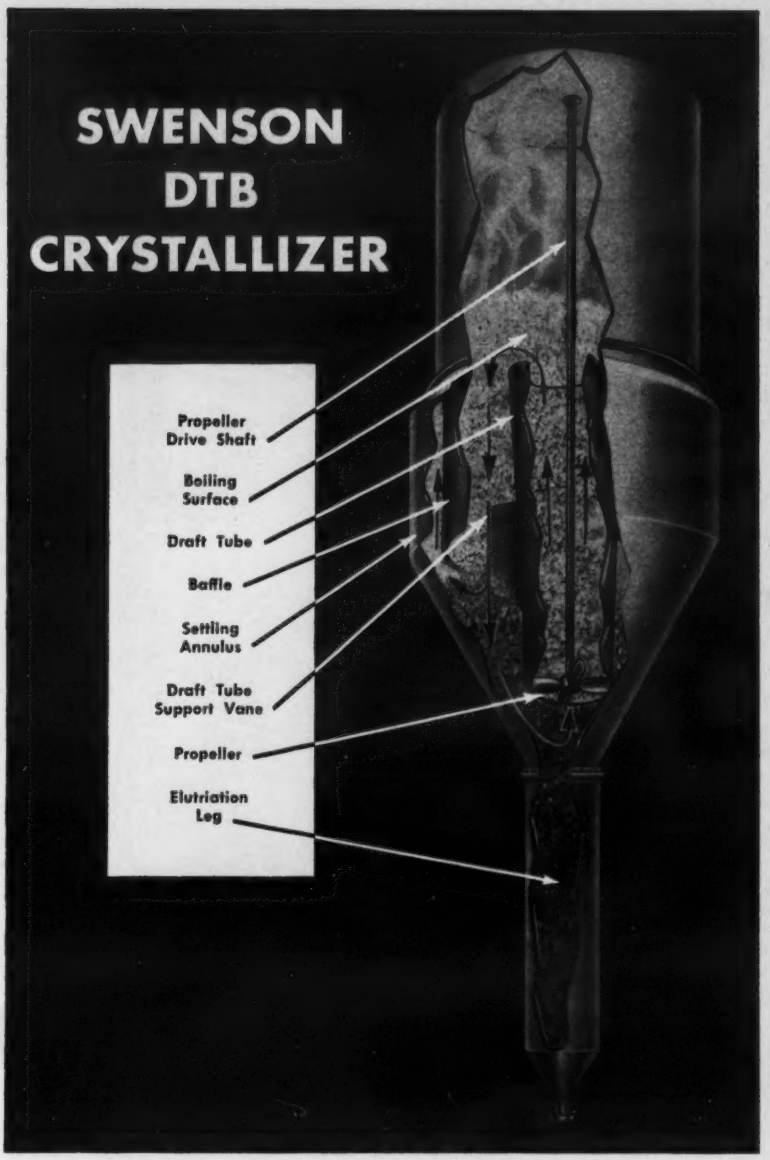
Call an instrument man to calibrate or modify!

(Contributed by Howard H. Fawcett, Consulting Engineer, Safety, Research Laboratory, General Electric Company, Box 1088, Schenectady, N.Y.)

NEXT MONTH

Visitors at Esso Standard's Baton Rouge, Louisiana, plant are likely to be startled by the sight of driverless trailers running about. These are used by the stores department to send a variety of maintenance supplies throughout the plant. Find out how they do it in this section next month.

SWENSON DTB CRYSTALLIZER



BASIC PRINCIPLES OF THE DRAFT TUBE BAFFLE CRYSTALLIZER

• Growing crystals are brought to boiling surface where super-saturation is most intense and growth most rapid • Sufficient seed surface is maintained at boiling surface to minimize harmful salt deposits on equipment surfaces • Low head losses in internal circulation paths permit large flows at low power requirements • Optimum fines removal is possible because of high flow-rate past separation zone

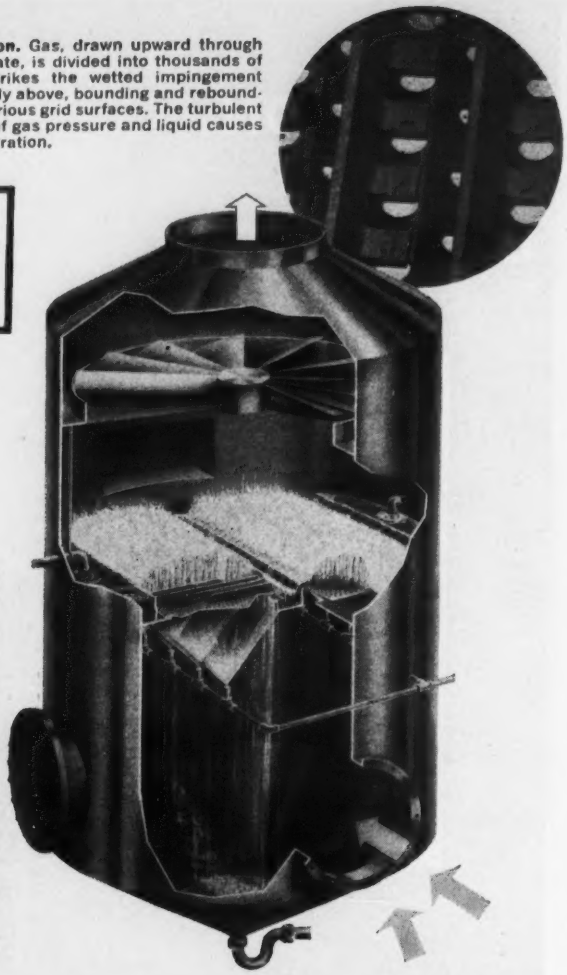
Swenson designs three types of DTB Crystallizers — Cooling, Evaporative and Reaction. To determine the one best suited to *your* needs, write to: Swenson Evaporator Company, 15667 Lathrop Ave., Harvey, Illinois. In Canada: Whiting Corporation (Canada) Ltd., 350 Alexander Street, Welland, Ontario, Canada.

PROVED ENGINEERING FOR THE PROCESS INDUSTRIES SINCE 1889
SWENSON
A Division of WHITING Corporation
WHITING — MANUFACTURERS OF CRANES; TRANBEAM® HANDLING SYSTEMS; PRESSUREGRIP; TRACKMOBILES,® FOUNDRY, AND RAILROAD EQUIPMENT
Visit us at booth 93 — 28th Exposition of Chemical Industries.

Check 1821 opposite last page.

Jet-swirl action. Gas, drawn upward through perforated plate, is divided into thousands of jets. Each strikes the wetted impingement surface directly above, bounding and rebounding against various grid surfaces. The turbulent intermixture of gas pressure and liquid causes complete saturation.

See Us at the CHEMICAL SHOW Booth 73



NEW FROM SINCE 1874 SLY

IMPINJET™ SCRUBBER

High Efficiency... Low Operating Costs

Now Sly brings you the simplest, most effective wet cleaning method known. The new IMPINJET Gas Scrubber assures thorough saturation of particles, even in sub-micron sizes.

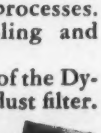
There are no moving parts. Complete cleaning results from the turbulent interaction of gas and liquid, as effected by the impingement baffle plate.

Pressure drop and resulting power requirements are low. Liquid consumption is only 1 to 3 gallons per 1000 CFM at 20-40 psig.

The IMPINJET Scrubber utilizes the proven principles contained in the original Harmon patents basic in the development of the impingement plate scrubber. Single-plate units effectively clean gases resulting from a wide variety of industrial processes. Multi-plate units are available for absorption, cooling and extra-high-efficiency applications.

For dust suppression, *wet or dry,* consult Sly — maker of the Dynaclone, the self-cleaning, continuously operating dry dust filter.

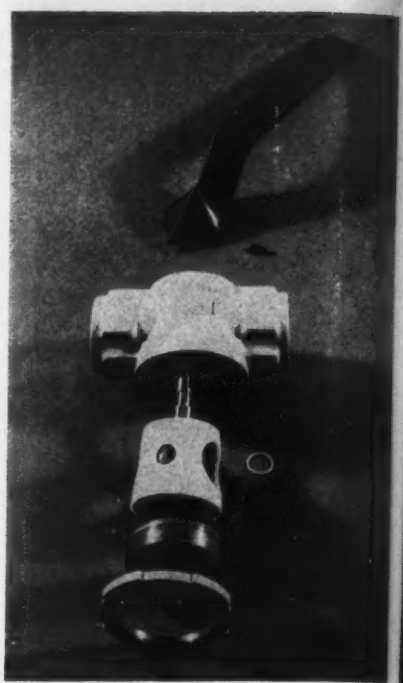
Send For New IMPINJET Catalog



THE W. W. SLY MANUFACTURING CO.

4754 TRAIN AVENUE • CLEVELAND 1, OHIO • OFFICES IN PRINCIPAL CITIES

Check 1822 opposite last page.



Only seven parts comprise the W-K-M ball valve. One-piece ball and stem are heat-pressure molded within the Teflon sealing capsule. Parts (from top to bottom in photo) are: handle, set screw for tightening handle, valve body which may be made of variety of metals, Teflon-sealing capsule containing ball and stem, stem seal (right of capsule), screw-in base plate that is turned for all adjustments within the valve, and lock nut

Simplified ball-valve design uses Teflon sealing capsule to cut parts total to seven

Unique valve heads parade of four new lines

THE SMILES of the ball-valve pioneers[1] at the quick and overwhelming CPI acceptance of their products may soon turn to frowns. True enough, this popularity has kept their cash registers ringing at a merry pace; but, this very-same-customer acceptance has proved too much for most valve makers to resist . . . resulting in rapidly stiffening competition in the field.

The latest group of manufacturers to announce new ball-valve lines consists of W-K-M Division of ACF Industries, Incorporated, General Kinetics Corporation, Pacific Valves, Inc., and Pittsburgh Brass Manufacturing Company.

Operating on the theory that there is more than one way to seal a ball valve, two of these firms — W-K-M and General Kinetics — have come up with radical design departures.

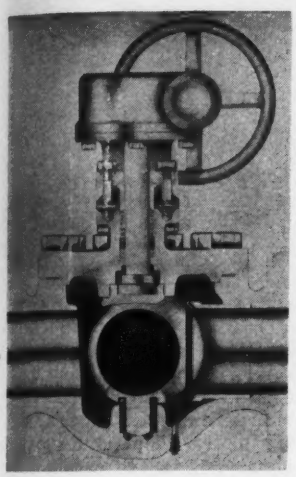
W-K-M's ball valve incorporates a Teflon-sealing capsule. This approach has reduced the total number of parts to seven and permits sealing adjustments to be made with a single turning of the

1) See "'Cinderella' ball valves strike it rich in CPI," August 1960 CP, p. 34.

valve's screw-in base plate.

The sealing capsule is a conical-shaped unit which contains the metal ball of the valve . . . much as the yoke is contained within the white of a hard-boiled egg. The one-piece ball and stem are heat-pressure molded within the Teflon capsule.

Because sealing and flow-control elements are thus joined in one piece, only seven parts comprise the valve. The other six are: body, handle, screw-in base plate, lock nut,



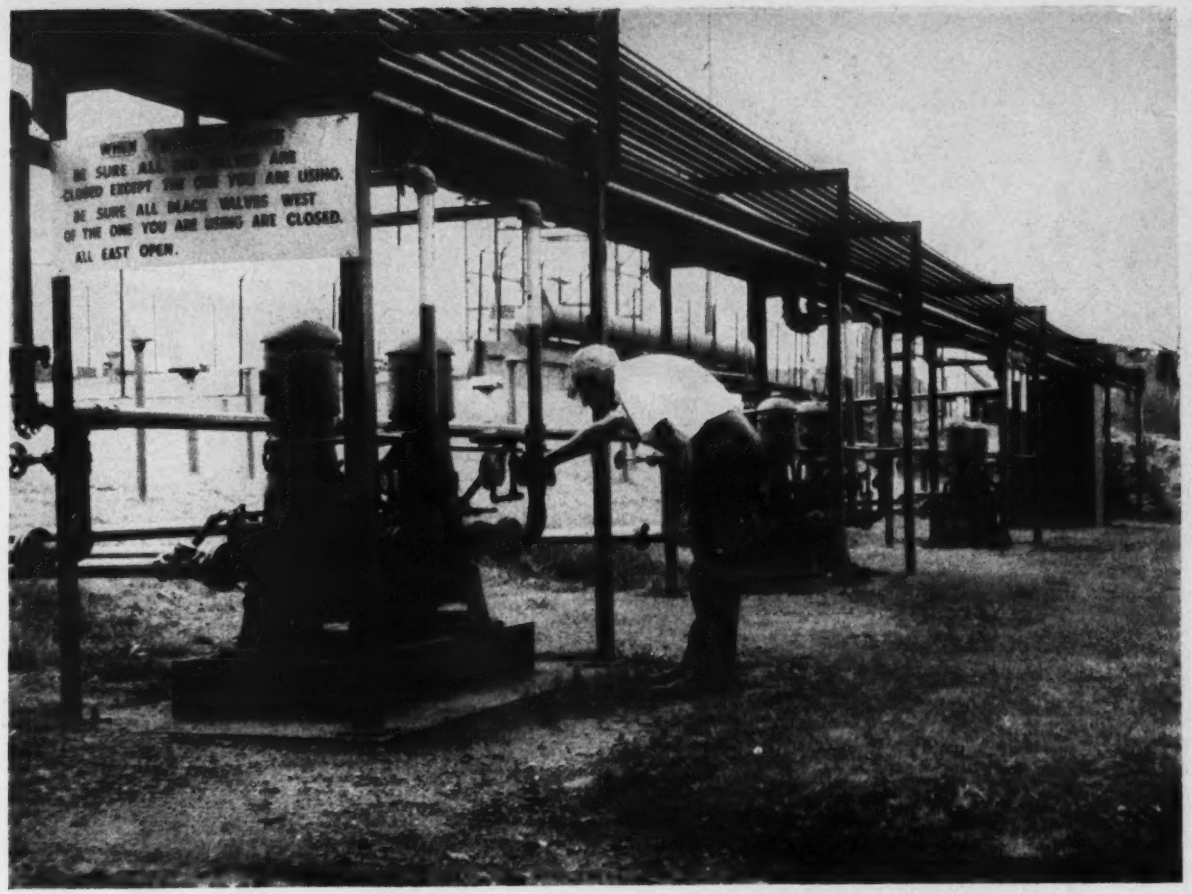
In General Kinetics' design, Teflon has been eliminated to boost upper temperature limit

set screw and Teflon stem seal.

A turn of the screw-in base plate forces the sealing capsule into increasingly tighter contact with the valve body and with the metal ball. This motion also compresses the Teflon gasket which serves as a stem seal.

This base plate is also the key to overhauling the valve — an operation which can be carried out in the line in three minutes, according to the manufacturer. In such an overhaul, the base plate and handle are removed to allow the sealing capsule to drop out. The stem seal is then replaced and a new sealing capsule inserted.

The valve is now being made in sizes of ⅛" to 2" for a working-pressure range of vacuum to 1500 psi. Tem-



Safety, Service and Satisfaction for B. F. Goodrich Company

The new Adhesives Plant of B. F. Goodrich Company at Akron, Ohio, is completely equipped with LaBour pumps for handling a variety of highly volatile solvents. The new plant was completed in 1959, but the pumps were used in the previous facility and date back to 1952. One LaBour pump purchased in 1942 is still on active duty here.

A row of ten LaBour Type G pumps shown in the photo pumps the solvents in and out of tanks and to the mixing plant 1,100 feet away. These are packingless pumps, so there is never any danger of leakage around the shafts—an important consideration with inflammable liquids. Also, there is no possibility that the solvents can be contaminated by lubricants. The self-priming pumps are ideal for the start-and-stop characteristics of the operation.

Your liquid moving problems may be of a different nature, particularly as to corrosion resistance. Whatever they may be, LaBour can provide the equipment to assure you the safety, economy and dependability which B. F. Goodrich Company has enjoyed over the years.

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

LABOUR

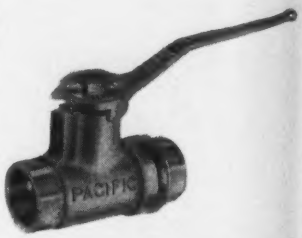
THE LaBOUR COMPANY, INC. • ELKHART, INDIANA
WHITE PIGEON, MICH. • LONDON, ENGLAND

"See our exhibit at the Chem Show"
Check 1823 opposite last page.

perature limit is, of course, governed by Teflon (to 600°F, depending upon fluid handled).

Metal parts of the valve may be fabricated from ductile iron, carbon steel, bronze, aluminum and several stainless-steel alloys. Screw, flange or weld ends are available. Small sizes have tapped holes for instrument-panel mounting.

General Kinetics has developed a ball valve which, like the Hills-McCanna valve featured in September, CHEMICAL PROCESSING[2] does not use Teflon (the conventional ball-valve seating and sealing material). This avoidance Teflon permits the valve's use at high temperatures and under radioactive conditions.



Pacific Valves' new models can be socket- or seal-welded

In operation, the ball of the valve is lifted away from the seat before it is turned. This is accomplished by means of an eccentric-cam action of the stem. Such a design permits use of hard metal-to-metal seating surfaces. Such a metal-to-metal seal was impossible heretofore because of binding which occurs when a metal ball is rotated against metal seats.

These valves are available with manual, pneumatic, electric or hydraulic operators.

Pacific Valves has extended its present line of ball valves to include a group designed for socket or seal welding. These valves are available in sizes of ¼" to 2" in carbon or alloy steels, for pressures to 1500 psi and temperatures of −40°F to +400°F. Ball seal and stem packing are made of Teflon.

To page 200

2) See "Ball-valve temp barrier overcome by new design," September 1961 CP, p. 148.

SAVE SPACE, SAVE WEIGHT, SAVE MONEY!

Dyna V

There's a *difference*, as you can see! The 10-groove D-section sheave in the foreground is replaced with the narrow 8-groove 5-V Dyna-V sheave on the line shaft. *Same power*, in a far more compact installation, with a $477 difference in price. And big future savings in belt replacement costs!

Everyone is going Dyna-V! Thousands of installations reveal that Dyna-V performance is *even better* than promised when we first introduced this new compact drive. In medium and high horsepower ranges, savings go as high as 30%!

Dyna-V can handle 3 times as much power in the same space. Dyna-V Sheaves decrease shaft overhang, increase bearing life. And Dyna-V Belts possess *all* premium qualities. Conditions requiring static conductivity or resistance to oil, moisture and heat are met by Dyna-V's one grade—the finest. Ask your Dodge Distributor, or write us for complete drive bulletin. Dyna-V Drives are available for capacities from 1 to 1500 hp.

Dodge Manufacturing Corporation, 6200 Union St., Mishawaka, Ind.

The Products with the Pluses...

DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Look under "Dodge Transmissioneer" in the *white* pages of your phone book. Factory trained by Dodge, he can give you valuable assistance.

Check 1824 opposite last page.

For more information on product at right, specify 1825. "See our exhibit at the Chem Show"

the SWENCH® is a wrench like no other — and will work where no other can. It's the world's first manual impact wrench. Loosens frozen nuts and bolts in seconds . . . tightens with precise accuracy every time. SWENCH is completely portable . . . needs no outside power — yet multiplies torque many times. It safely handles more bolt sizes than any comparable power wrench, but costs less. Read how you'll save with the SWENCH:

SWENCH® cuts man-hours on Bayway Refinery jobs

At Humble's Bayway Refinery, there are a lot of tough bolt and nut loosening jobs — and there are SWENCH wrenches in all tool cribs!

For over three maintenance-free years, SWENCH has been loosening bolts and nuts exposed to heavy coking, prolonged exposure to high temperature and corrosion. Typical savings with the SWENCH — 14 man-hours removing 28 big bolts on the yoke and gear of a Chapman gate type valve. Comparable savings on loosening 2" studs on heat exchangers and product coolers.

The amazing SWENCH works anywhere, carries its power built-in. Exerts many times the energy needed to pull the handle, smoothly and evenly: gives you more power with greater safety.

Six models cover bolt sizes from ½" to 2½". For the full story on SWENCH, how it works, what it costs, how it saves, see your local distributor, or write:

A FEW DISTRIBUTOR TERRITORIES ARE STILL AVAILABLE

DISTRIBUTED IN CANADA BY:
CANADIAN CURTISS-WRIGHT LTD
TORONTO & MONTREAL CANADA
32-37

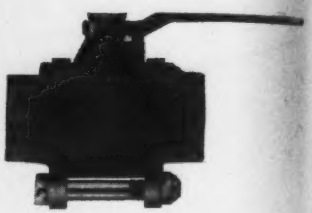
MARQUETTE DIVISION
CURTISS-WRIGHT
CORPORATION
1145 GALEWOOD DRIVE • CLEVELAND 10, OHIO

Check 1826 opposite last page.

From page 198

The body joint of each valve is seal-welded. Stem packing can be adjusted in the field with a hand wrench, while the entire packing assembly can be disassembled without removing the valve from the line.

Pittsburgh Brass Manufacturing is the only one of the four manufacturers new to the ball-valve field. (General Kinetics is the maker of the Paul valve, a sort of cousin to the conventional ball valve[3].) Pittsburgh Brass offers a conventional bronze ball valve in sizes of ⅛" to 2". Some sizes in stainless steel are now available; a complete selection will be ready soon, according to advice from the manufacturer.



Pittsburgh Brass Manufacturing now offers a ⅛" to 2"-size range of conventional brass ball valves

Additional Data Available

Additional information may be obtained on the aforementioned ball valves by contacting the following manufacturers:

Department 312, W-K-M Division, ACF Industries, Incorporated, Box 2117, Houston 1, Tex.

Check 1827 opposite last page.

General Kinetics Corporation, 197 S. Van Brunt St., Englewood, N.J.

Check 1828 opposite last page.

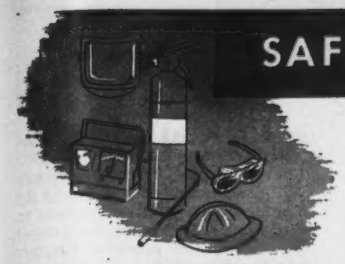
Pacific Valves, Inc., 3201 Walnut Ave., Long Beach 7, Calif.

Check 1829 opposite last page.

Pittsburgh Brass Manufacturing Company, 3155 Penn Ave., Pittsburgh, Pa.

Check 1830 opposite last page.

3) See "Paul valves are good bet for throttling applications, high-temperature service," September 1960 CP, p. 168.



SAFETY SLANTS

conditions. Actual UL tests are for areas 2½-times the rating given.

(Hand-portable extinguishers are product of Cardox Division, Chemetron Corp., 840 N. Michigan Ave., Chicago, Ill.)

Check 1832 opposite last page.

Safety on wheels

. . . is represented by mobile safety dispenser for flammable liquids. Unit incorporates special flammable-liquid transfer pump fitted with a six-ft Neoprene hose which has sealed-in static grounding wire.

Vacuum breaker mechanism in pump instantly shuts-off liquid flow and prevents spillage. Transfer pump handles as much as five gpm.

The 60-gal-capacity steel tank, which is tested to 25 psi, is internally baffled to prevent liquid surge.

(Mobile safety dispenser is product of The Protectoseal Company, 1920 S. Western Ave., Chicago, Ill.)

Check 1831 opposite last page.

Amateur fire fighters

. . . can effectively use a new line of hand-portable carbon-dioxide fire extinguishers.

Ratings given by the Underwriters' Laboratories, Inc., (based on test fires in open containers using gasoline as fuel) are 4BC, 8BC, 12BC, and 12BC (CQ) for the five models in the line with capacities of 5, 10, 12, 15 and 20 lb of carbon dioxide, respectively.

In determining such ratings, UL takes into consideration not only results of tests under ideal laboratory conditions, but also their use by untrained persons under emergency fire

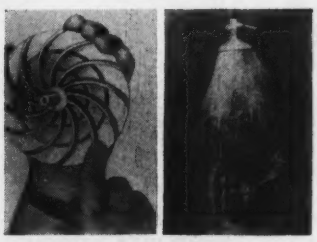
Take your pick

. . . of hazardous gases to be monitored by alarm detector which indicates percentage below explosive concentration of flammable gases.

Unit operates on catalytic-platinum-filament principle. It may be calibrated for any flammable gas.

(Gas-O-Larm detector 350 is product of Beard Instruments, Inc., 3963 Kirby Drive, Houston, Tex.)

Check 1833 opposite last page.



New shape in showers

. . . is produced by an impeller-action shower head (left) which results in a drenching, swirling sheet of water which floods the victim's body (right).

Swirling action of water is produced by means of 12 impellers and two circular grooves, which are machined in face of shower head.

In operation, unit discharges up to 63 gpm at 20-psi flow pressure with one-inch supply line. Up to 160 gpm may be obtained with 1½" supply line and 18-psi flow pressure. Shower head is eight inches in diam and is available in a number of materials.

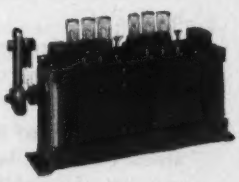
(S-800 Lifesaver Shower Head is product of Speakman Co., Wilmington, Del.)

Check 1834 opposite last page.

How to STRETCH

a drop of oil...

Manzel force-feed lubricators squeeze the full potential out of every drop of oil you purchase. Model "94", for example, pumps against pressures up to 3,000 pounds, handling any grade of oil from the lightest mineral oil to the heaviest cylinder stock with the same regularity. Model "94" starts, stops, speeds up and slows down in synchronization with your machinery. Every change in engine speed brings a corresponding change in the amount of oil delivered. For details on our whole line of *responsive, responsible* lubricators, write for our catalog. Manzel, 251 Babcock Street, Buffalo 10, New York. For the most efficient lubrication,



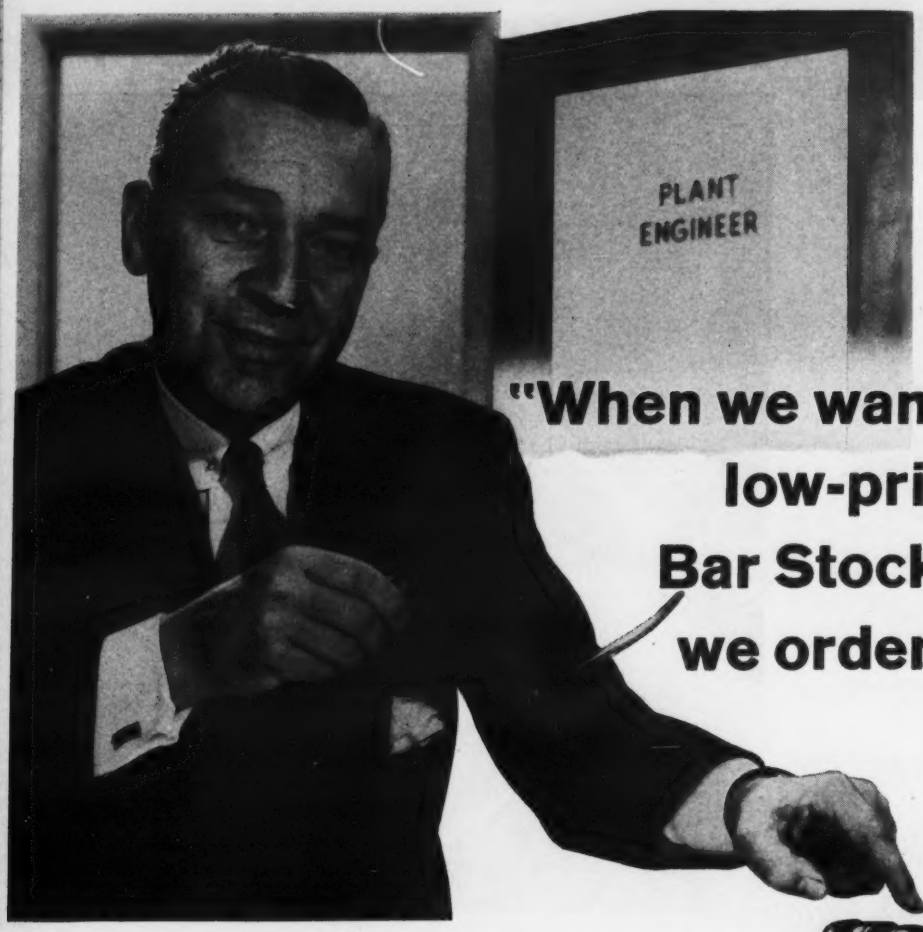
ask the man from

A UNIT OF HOUDAILLE INDUSTRIES, INC.

Manzel

SPECIALISTS IN LUBRICATORS AND METERING PUMPS SINCE 1898

Check 1835 opposite last page.



"When we want rugged, low-priced Bar Stock Valves we order R-P&C"

"For a really versatile, **all-purpose** valve, we've found there's none better than R-P&C bar stock valves. Designed and built **for close control service,** the construction of these valves makes them well suited to many general purpose applications as well. For example, the **compactness** of R-P&C bar stock valves is particularly advantageous for close-coupled installations in instrument lines or on panel boards and for pressures up to 10,000 lbs. in steel."

These valves are available in a wide variety of materials to withstand extremely high temperatures and pressures. But best of all, R-P&C bar stock valves are economically priced. This is made possible through special techniques developed by R-P&C.

We highly recommend R-P&C bar stock valves for meter, gauge, sampling, or test valves on equipment requiring a reliable compact valve that can withstand high pressure service.

Contact your R-P&C distributor for full details about bar stock valves in bronze, carbon and stainless steels plus the complete line of R-P&C gate, globe and angle valves in all standard materials.

R-P&C VALVES

ACCO

R-P&C Valve Division, American Chain & Cable Company, Inc.

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

Check 1836 opposite last page.

NEW LITERATURE

Plant Engineering, Safety and Fluids Handling

There are 3,548 different refractories' brands listed in the 1961 version of the "Product Directory of the Refractories Industry in the United States." This represents an increase of 24% over the number included in the previous directory published in 1958.

Special sections of the directory are devoted to manufacturers' names and addresses, plant locations by state and city, product divisions and a complete list of brand or trade names.

Copies of this 224-page source of who makes what and where in the refractories industry are available at $4.50 each from The Refractories Institute, First National Bank Building, Pittsburgh, Pennsylvania.

Methyl-Ethyl-ketone safety data sheet details properties, hazards, engineering control of hazards, employee safety, fire fighting, handling and storage, tank and equipment cleaning and repairs, waste disposal, medical management and first aid. Copies of "Properties and Essential Information for Safe Handling and Use of Methyl Ethyl Ketone" (Safety Data Sheet SD-83), are available at $.30 per copy from the Manufacturing Chemists' Association Inc., 1825 Connecticut Ave., N.W., Washington 9, D.C.

A hazardous-chemicals data summarization is a completely revised version of a former table. It discusses hazardous properties of 38 chemicals. In addition to adding common synonyms for each chemical discussed, preparation of the new version has included a careful review of every item with all material being brought up to date and expanded. Copies of 54-page publication, "Hazardous Chemicals Data" (NFPA No. 49M) are available at $.75 each from the National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass.

Hazardous gases are subject of six-page brochure listing 504 toxic gases and recommending proper gas-mask canisters to use in combating each gas or combination thereof. Tabulation for each gas also includes explanatory remarks and ACGIH limits. Protection Guide — Acme Protection Equipment Company.

Check 1837 opposite last page.

Drives and couplings, which incorporate heat-treated steel shot as "Fluid," are topic of 20-page bulletin incorporating installation photographs, product pictures and engineering drawings. Bul-70—Dodge Manufacturing Corporation.

Check 1838 opposite last page.

for answers to chemicals handling problems

DURCO MAKES PUMPS: standard centrifugal and self-priming designs to handle practically any acid or chemical solution. The first practical heavy duty reverse casing, foot mounted chemical pumps were made by DURCO.

DURCO MAKES VALVES: SLEEVELINE® and Y-Valves are made in a complete range of alloys for use in chemical processes. The first practical Teflon* sleeved non-lubricated plug valves for the chemical industry were designed and manufactured by DURCO.

DURCO MAKES FILTERS: rotating leaf, horizontal, and vertical pressure leaf, and tubular designs. The first fully automated pressure leaf filter operation was made possible by Durco's patented cake thickness detector.

*Registered trademark of the DuPont Co.

DURCO MAKES SINKS, and troughs, and drainboard-sink units for all chemical laboratory applications. The first successful cast epoxy resin laboratory sinks were developed by DURCO.

Durco makes other chemical process equipment including pipe and fittings, heat exchangers, steam jets, anodes, acid concentrating towers, and many other items.

In fifty years Durco has devoted *all* of its efforts to the research and development of improved materials, and the manufacture of new equipment to handle chemical solutions better, with less corrosion, at economical costs.

Booths 520-532
at the Chem Show

DURCO

THE DURIRON COMPANY INC., *Dayton, Ohio / Serves the process industries*

Check 1839 opposite last page.

FIVE-STAGE EVACTOR AND BOOSTER

NEW TEST CENTER for PROVING and IMPROVING EJECTORS

You are cordially invited to visit this new building devoted entirely to testing, development and research. Here you will see facilities as modern and complete as any existing for the testing of steam jet vacuum equipment.

Floor space and test blocks are sufficient to permit the simultaneous testing of a variety of equipment along with special testing of vacuum processing under actual operating conditions. To assist, we have a steam generating plant equipped with two boilers: one of capacity up to 25,000# per hour at 250# ga; the other, 4,000# per hour at 600# ga. Also: a 60,000-gallon cooling pond and assorted liquid pumps up to 3,000 gpm for both positive pressure and vacuum service; a 4,000 square foot surface condenser; a 6-ton hoist.

Under the same roof for use in research are other types of heavy equipment and laboratory instruments of most accurate design. All together, the facilities of our testing and research center give extra assurance that jet vacuum equipment, fume scrubbers and cooling units from Croll-Reynolds will perform exactly as specified.

CROLL C R REYNOLDS

Croll-Reynolds CO., INC.

Main Office: 751 Central Avenue, Westfield, N. J.

Chill-VACTORS® • Steam-Jet EVACTORS® • Aqua-VACTORS® • Fume Scrubbers • Special Jet Apparatus

"See our exhibit at the Chem Show"

Check 1840 opposite last page.

manufacturers' current literature

This section features a variety of literature currently available from manufacturers. See also the other sections in this issue for new literature pertaining to those particular sections

Corrosion Control

Teflon packings are specified in Bul CP552—Chemical & Power Products, Inc.

Check 1841 opposite last page.

Vacuum and quick-cooling pans are available in capacities, respectively, of 10- to 500-gal and 50- to 200-gal. They are treated in bulletins available from Lee Metal Products Company, Inc.

Check 1842 opposite last page.

Stainless-steel, PVC and UPVC pipe, valves, tube, sheet, flanges, and the like are all available from Esco.

Check 1843 opposite last page.

Pyrex glass pipe is covered in Bul PE-3 — Plant Equipment Department, Corning Glass Works.

Check 1844 opposite last page.

Corrosion-resistant fans are designed for various conditions made of fiber glass, cast iron and cast lead . . . in addition to wide range of special alloys. Rubber-lined and coated models are also available. Air Handling Division, Buffalo Forge Company.

Check 1845 opposite last page.

Penton tank linings are serviceable at temperatures to 280°F. Gar-Line Tank Linings — Special Products Dept., Garlock Inc.

Check 1846 opposite last page.

Corrosion-resistant-kettle line includes standard-jacketed 5- to 500-gal, standard-jacketed 80- to 300-gal, center-line scraper-agitator 80- to 300-gal, standard-jacketed 5- to 100-gal, and standard-jacketed 40- to 200-gal models. They are subjects, respectively, of A, CW, CW3T, B, C, and Pressure Kettle Buls — Lee Metal Products Company, Inc.

Check 1847 opposite last page.

Saran-lined pipe has needed no replacement or repair after ten years of service during constant flow of corrosive acids, wet chlorine and sodium hydroxide . . . at temperatures to 185°F. Additional information is available from Dept. 1564LG11, Saran Lined Pipe Company.

Check 1848 opposite last page.

Titanium heat-exchanger tube offers corrosion resistance, lightness and strength in relation to weight . . . the combination of which are illustrated in data tabulated in Titanium Tube Information—Dept. R, Wolverine Tube, Division of Calumet & Hecla, Inc.

Check 1849 opposite last page.

Fiber-glass trays have cut replacement costs in half to save $8000 per year at two American Cyanamid Co. plants. For full story, see Toteline Trays Information — Molded Fiber Glass Tray Co.

Check 1850 opposite last page.

Plug valves incorporate Teflon sleeves. They have up to ¼" vertical adjustment for seal wear. Complete story is contained in Bul V/14 — The Duriron Company, Inc.

Check 1851 opposite last page.

Corrosion-resistant tanks for pulp and storage are subjects of bulletins put out by Lee Metal Products Company, Inc.

Check 1852 opposite last page.

Flexible Teflon tube stays flexible and serviceable in temperature range of −450 to +500°F. Pennsylvania Fluorocarbon Co., Inc.

Check 1853 opposite last page.

Rubber-lined tanks for corrosion and contamination protection are fabricated from multiple-calendered sheets. They are presented in Cat 7115 — Manhattan Rubber Division, Raybestos-Manhattan, Inc.

Check 1854 opposite last page.

Diaphragm pumps designed for corrosive applications are tabulated in Bul 148 — T. Shriver & Co., Inc.

Check 1855 opposite last page.

A vinyl-based protective coating developed especially to simplify maintenance painting is considered in Tygon SB Literature — Dept. C, Coatings and Linings Division, U. S. Stoneware.

Check 1856 opposite last page.

Teflon-products line includes sheets, rods, tube, hose, tape and complete machined parts. Plastic Products Division, Raybestos-Manhattan, Inc.

Check 1857 opposite last page.

Aluminum-bronze alloy tube has proved-out in 34-day test in which it was subjected to cooling overhead acid vapors discharging from H_2SO_4 concentrator. Ampco Tube — Department 131-J, Ampco Metal, Inc.

Check 1858 opposite last page.

Processing Equipment

The Dresden Industrial District offers an ideal site for a balanced community of heavy, medium and light industry and R & D laboratories, as well as homesites, schools and recreational areas. For more information, see Dresden Brochure which is available from Dresden Development Company, C/O Davis, Pain & Company.

Check 1859 opposite last page.

Rotary coolers are available in four types: gas-cooled, water-cooled shell, tubular, and direct-contact water. Further information may be obtained from Hardinge Company, Incorporated.

Check 1860 opposite last page.

Processing-equipment line includes blenders, agitators, mixers, screens and reactors. Patterson Foundry and Machine Company.

Check 1861 opposite last page.

Concentrators line includes model which increased P_2O_5 in wet-process phosphoric-acid concentration from 54 to 72%. Kelly Concentrators — Process Equipment Division, General American Transportation Corporation.

Check 1862 opposite last page.

Crystallizers are available in three designs — for cooling, evaporation and reaction. DTB Crystallizers — Swenson, Division of Whiting Corporation.

Check 1863 opposite last page.

Small hydrogen-sulfide unit will produce to 2000 lb/day and larger one puts-out in range of 2000 to 10,000 lb/day. The utilize process based on reaction of hydrogen with liquid sulfur at elevated temperature and pressure to produce hydrogen-sulfide gas. Girdler Corporation, Subsidiary of The Chemical & Industrial Corp.

Check 1864 opposite last page.

Single-unit processors for blending, adding liquids to dry powders, granulating, drying and chemical reactions, are covered in Rota-Cone Cat — Paul O. Abbe Inc.

Check 1865 opposite last page.

Processing equipment is fabricated from various alloys by Angola Alloy Fabricators.

Check 1866 opposite last page.

FABRICATED SCREEN SECTIONS TO FIT EVERY VIBRATING SCREEN MADE
Tyler fabricates screen sections to fit every existing type of vibrating screen. This aggregate cloth is drawn from inventory, quickly fabricated to give you fast delivery. Tyler-developed hook strips maintain drum-head tension for long service life.

SAMPLES OF SCREENED MATERIALS MAY ANSWER YOUR SEPARATING PROBLEMS
The Tyler Customer Service Laboratory keeps on file data and samples from years of evaluating screening problems. When you have a new application, check Tyler for technical recommendations based on experience and thorough evaluation.

Wire cloth so finely woven it screens out light!

Openings in this woven wire cloth are so tiny they're specified in microns—millionths of an inch. This is Tyler stainless steel wire cloth, 325 x 2300 mesh, used in filtering fuel in aircraft engines. Whatever your special needs in wire cloth, Tyler can supply you from the world's broadest line—covering thousands of different specifications.

TYLER CUTS YOUR COST OF SCREENING

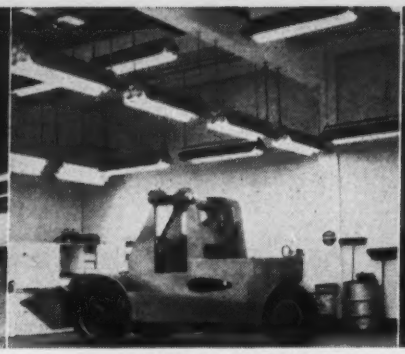
• Requirements matched from world's broadest line of wire cloth • Fast shipments from the industry's largest inventory • Technical service backed by unique Customer Service Laboratory.

TYLER

THE W. S. TYLER COMPANY *Cleveland 14, Ohio* • OFFICES: Atlanta • Boston • Chicago • Dallas • Los Angeles • New York • Philadelphia Pittsburgh • Salt Lake City • San Francisco • The W. S. Tyler Company of Canada, Limited, St. Catharines, Ontario • OFFICE: Montreal

"See our exhibit at the Chem Show"
Check 1867 opposite last page.

"EFU" Explosion-Proof Fixtures Give Safe, Bright Illumination in Paint Plants . . .



Dependable, Trouble-Free Service in Hazardous Area Paint Shops . . .

Modern, 45° Angle Mount in Garage Pits . . . or Wherever Safe Lighting is Required

For Hazardous Area Lighting You Can Rely On...

APPLETON®

"EFU" Explosion-Proof Fluorescent Fixtures

Type "EFU" 2-Lamp Fixture 45° Angle Mounted and Suspended From Type "ESS" Swivel Mounted On "GRFC" Flanged Unilet With Canopy

Pat. No 2,392,202 and Pat. Pending

Quality built in every detail, APPLETON "EFU" fixtures are prefectly designed and carefully constructed by experienced craftsmen. Factory sealing eliminates the need for external seals. In addition, all models have cast aluminum end housings containing terminal blocks where line connections are made, and aluminum threaded covers to protect line connections, starters and lamps from hazardous fumes, dirt or dust. All lamps are protected and totally enclosed by heavy Pyrex glass tubes. APPLETON "EFU" fluorescent fixtures are U.L. and C.S.A. approved and meet specifications of Article 500 of the National Electric Code.

Sold Through Franchised Distributors Only

- **Choice of 33 different models (see chart below)**
- **Available in 2, 3, or 4 lamp styles**
- **Choice of horizontal or 45° mounting**
- **Steel reflectors . . . white enameled inside, grey outside**
- **Relamping from either end**
- **"Rapid Start" ballast where desired**
- **Streamlined design, totally enclosed yet easily accessible**
- **Application layouts furnished by APPLETON upon receipt of installation data**

"EFU" Fixtures Available As Indicated By •

Circuit Voltage 60 Cycle	40 WATT, 48 INCH T-12			100 WATT, 60 INCH T-17—Bi-PIN		No. Lamps
	Bi-Pin		Single-Pin Instant-Start Slimline			
	Pre-Heat	Rapid-Start		Pre-Heat	Rapid-Start	
110—125	•	•	•	•		2
	•	•	•			3
	•	•	•	•		4
199—216	•					2
	•					4
220—250	•	•	•			2
	•					3
	•	•	•	•	•	4
250—290	•	•	•	•		2
		•	•			3
	•	•	•	•	•	4

APPLETON Electric Company

1701 Wellington Ave. • Chicago 13, Illinois

Also Manufacturers of:

Malleable Iron Unilets & Covers

"ST" Series Connectors

"Eagle Claw" Switch Boxes

Reolites

Check 1868 opposite last page.

CURRENT LITERATURE

Water-bed steel-belt coolers are available with belts to 48" in width and in any length. In operation, steel band floats on water-bed tank of circulating water or other coolant. Steel-Belt Coolers — Steel Belt Conveyor Department, Sandvik Steel, Inc.

Check 1869 opposite last page.

Tower-packing support plates, distributors and hold-down plates are taken up in Bul TA-40 — Process Equipment Division, U. S. Stoneware.

Check 1870 opposite last page.

Continuous carbon feeding and blending saves material, reduces costs, and controls quality . . . according to booklet, "It's A Fact" — B-I-F Industries, Division of The New York Air Brake Company.

Check 1871 opposite last page.

Columns incorporating rotating-disc contactors can be used for liquid-liquid, liquid-solid and liquid-slurry extractions. They are delineated in Bul T-1159 — Process Equipment Division — Turbo-Mixers, General American Transportation Corporation.

Check 1872 opposite last page.

Processing equipment is made to order by Sun Shipbuilding & Dry Dock Company.

Check 1873 opposite last page.

Process Instrumentation

Ultrasonic sensors for liquid- and dry-level control are accurate to within 0.005" and each have response times of 25 milliseconds. Sonac Level Controls—Delavan Manufacturing Company.

Check 1874 opposite last page.

Nuclear gages have precision and repeatability of ±2% of full scale or better, with ranges as narrow as 0.025 sgu (4° Be, 5° Tw, 10° API, 5% solids). For more details, see Nuclear Gages Literature — The Ohmart Corporation.

Check 1875 opposite last page.

Magnetic flow transmitter is designed to measure flow of fluids with electrical conductivity as low as that of distilled water. It is covered in Bul 98418 — Taylor Instrument Companies.

Check 1876 opposite last page.

Gas analyzers continuously analyze and record as many as six constituents. Single- and multi-point instruments are available for variety of applications which are discussed in Application Literature—Cambridge Instrument Company, Inc.

Check 1877 opposite last page.

THAT'S INTERESTING

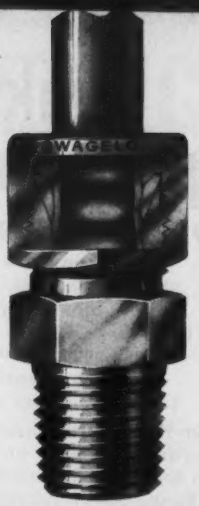
Greenbacks not esthetic

Howard Ketcham, color authority and consultant to American Cyanamid Company, thinks orange dollar bills would be more practical, esthetically more pleasing, and would circulate faster.

He has been advocating a change in the color of U.S. paper currency for 15 years, but sees little hope of the U.S. going off the "green standard" in the immediate future.

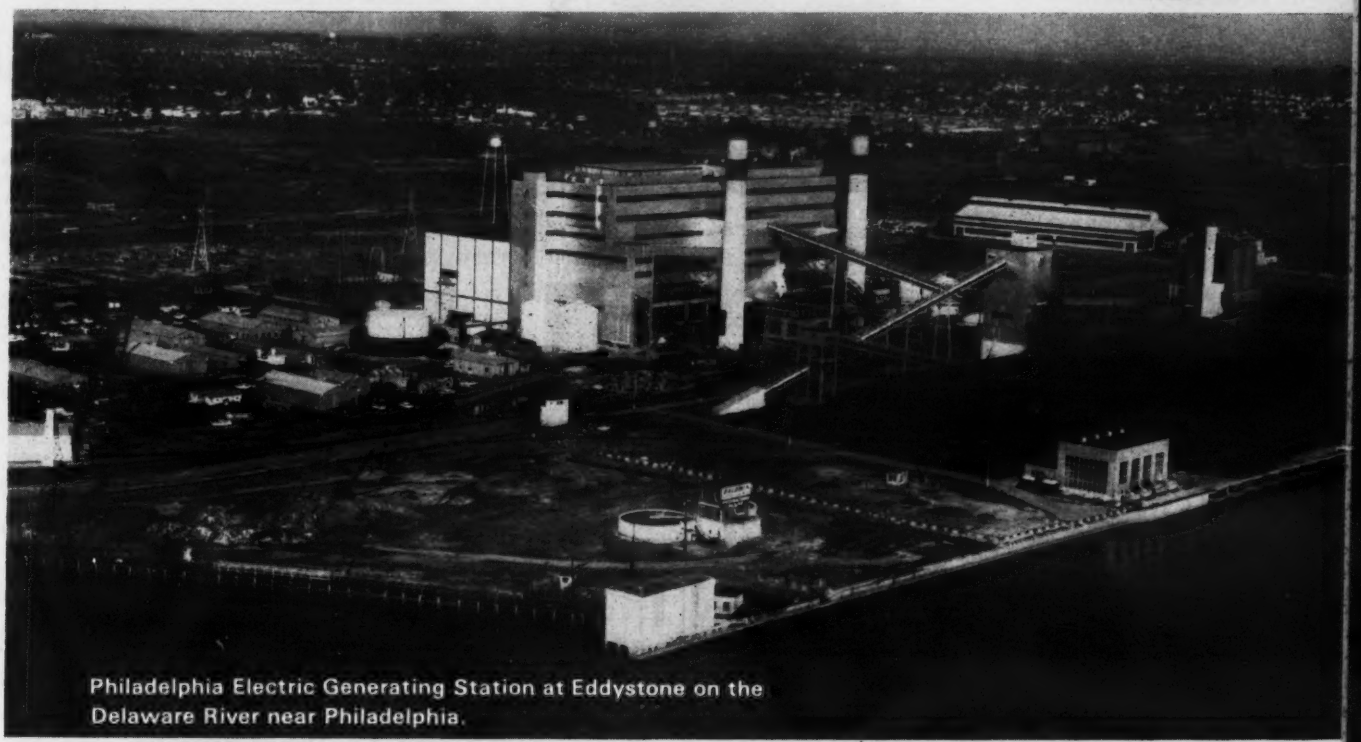
For larger denominations, he tentatively suggests the following hues—$5, magenta; $10, blue; $20, purple. The backs of bills could remain green in deference to custom.

WORLD'S MOST EFFICIENT POWER STATION SPECIFIES MOST EFFICIENT TUBE FITTINGS



Swagelok®

Philadelphia Electric Company's new Eddystone Station is an engineering achievement of which Americans can be proud. Representing a major breakthrough in the power industry, the Eddystone Electric Generating Station was designed as the world's most efficient power plant. This improvement in efficiency has been achieved by generating steam at a supercritical pressure of 5000 pounds per square inch and a temperature of 1200° F.

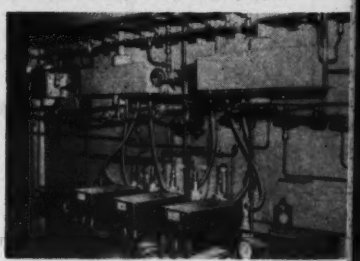


Philadelphia Electric Generating Station at Eddystone on the Delaware River near Philadelphia.

Housing two 325,000 kilowatt turbine generators, this giant station can produce enough power to supply the residential needs of a city of five million people.

Control Center for Eddystone Plant Operation.

Swagelok Tube Fitting used as a thermocouple connector on main steam header #1 for boiler control. Operating conditions: Steam at 5000 psig — 1200° F.



Swagelok Tube Fittings used in contr systems of supercritical pressure boil

Swagelok® TUBE FITTINGS

Crawford Fitting Company, 884 East 140th Street, Cleveland 10, Ohio • Crawford Fittings (Canada) Ltd., Niagara Falls, Ontario, Canada

"See our exhibit at the Chem Show"

Check 1878 opposite last page.

Binks Spray Nozzles

FOR ANY APPLICATION

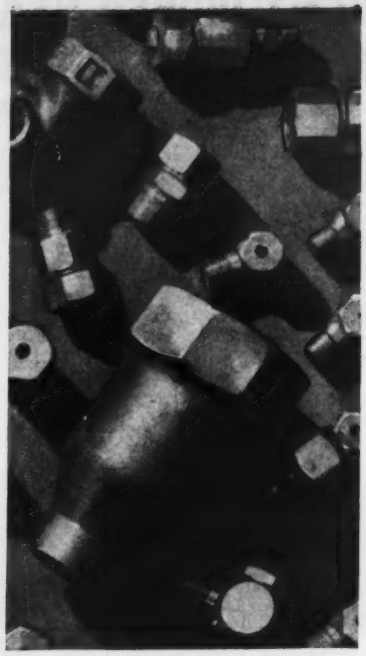
any size
(orifices from .025" to 1 13/16")

any pattern
(hollow cone, full cone, standard & wide angle, round & flat)

any capacity
(.15 to 230 gallons per minute!)

Your Binks Distributor has the nozzle you need right on his shelf. See him today for complete information on Binks Spray Equipment.

Free: Send for your illustrated copy of Bulletin No. 5900 which describes the broad range of Binks Nozzles available for use in your particular application.



Ask about our spray painting school. Open to all... NO TUITION... covers all phases.

Binks Manufacturing Company 3142 Carroll Avenue, Chicago 12, Ill.

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Binks A complete line of industrial spray nozzles and cooling towers

Check 1879 opposite last page.

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Hopper-level switches and flow-control valves for fine or coarse materials are detailed in publication available from Syntron Company.

Check 1880 opposite last page.

Helicoid gages have been tested through 75,000,000 cycles. For details, see Cat DH-65—Helicoid Division, American Chain & Cable Company, Inc.

Check 1881 opposite last page.

Diaphragm valves for automatic and remote flow control are subject of bulletin giving complete selection data. Bul 134-A — Hills-McCanna Company.

Check 1882 opposite last page.

Metering pumps are tabulated in Cat 59—Process Equipment Division, Lapp Insulator Co., Inc.

Check 1883 opposite last page.

Viscometers for automatically measuring viscosities in process each utilize falling-piston design. Dept. A67, Norcross Corporation.

Check 1884 opposite last page.

Metering pumps have all moving parts inside running in oil. They are available in four standard sizes to 54 gph for pressures to 300 psi. Full story is contained in Metriflow Information — The Madden Corporation.

Check 1885 opposite last page.

Specification of solenoid valves is taken up in eight-page brochure including drawings, diagrams, charts and curves . . . and solenoid selection is reviewed in 16-page manual listing over 500 corrosive media. Solenoid Valves Data — Valcor Engineering Corp.

Check 1886 opposite last page.

Liquid meters are available in bronze, galvanized iron and stainless steel for flows in 1- to 1000-gpm range. Data on them is contained in Niagara Meters Information—Dept. CP, Buffalo Meter Company, Inc.

Check 1887 opposite last page.

Viscometer for in-process viscosity measurement is detailed in four-page data sheet including page of information on installation. Data Sheet 819 — Brookfield Engineering Laboratories, Inc.

Check 1888 opposite last page.

Pneumatic receiver for graphic panel applications permits start-up by adjustment of process to line-up color-coded indicators and then a switch to automatic or cascade operation. For full story, see 670 Metagraphic Receivers Data—The Bristol Company, Subsidiary of American Chain & Cable Company, Inc.

Check 1889 opposite last page.

Temperature controllers are taken up in data available from West Instrument Corporation, Subsidiary of Gulton Industries, Inc.

Check 1890 opposite last page.

Thermocouples, which are metal-sheathed and ceramic-insulated are available in diameters of 1/25 to 7/16" and immersion length of ½" to 70'. They are tabulated in 48-page Cat TC-5 — Thermo Electric Co., Inc.

Check 1891 opposite last page.

Liquid-batching system has automatic reset and is adaptable to practically any liquid-measuring problem. System is available in either jacketed or unjacketed construction. It is depicted in Bul F1-56 — Hetherington & Berner Inc., Subsidiary of American Hoist & Derrick Co.

Check 1892 opposite last page.

Viscometers for use in low- and high-viscosity ranges are pictured and explained in eight-page bulletin; also covered are explosion-proof models. Viscometer Bul — Brookfield Engineering Laboratories, Inc.

Check 1893 opposite last page.

Separation

Vibrating-screen separators are subject of Separators Details—Southwestern Engineering Co.

Check 1894 opposite last page.

Centrifugal fans are indexed in Bul FD11—Fly Ash Arrestor Corporation.

Check 1895 opposite last page.

Involute-cyclone dust collector is considered in four-page bulletin explaining in detail, and with the aid of drawings, the operation of the unit. Bul 180 — Air Pollution Control Division, John Wood Company.

Check 1896 opposite last page.

Dust collectors utilize air-bubble cleaning to eliminate dust traps, shakers and blow-back mechanisms. They are subject of Inductaire Details — Dustex Corporation.

Check 1897 opposite last page.

Magnetic-drum separators are available in sizes of 12 to 36" in diameter and widths of 8 to 84". Additional information on them may be obtained from Eriez Manufacturing Co.

Check 1898 opposite last page.

Filter installations are pictured and summarized in six-page brochure, Bul Inst. 1961—Peterson Filters and Engineering Company.

Check 1899 opposite last page.

Cyclone dust collectors are specified in four-page bulletin giving volume-draft-loss nomograph and typical collection-efficiency curves. Bul 140 — Air Pollution Control Division, John Wood Company.

Check 1900 opposite last page.

Wet and dry separations, screening action, construction of screens, and single- and multiple-surface screen models for small and large capacities, are all covered in Bul 905 — The Orville Simpson Company.

Check 1901 opposite last page.

Processing equipment incorporating rotary-motion principles includes graders and disc separators. Simon-Carter Co.

Check 1902 opposite last page.

Rotary vacuum filters are topic of six-page brochure covering disc units with top-entering propeller agitation and drum models with top-feed reservoirs . . . "Filters and their Application" — The Peterson Filters and Engineering Company.

Check 1903 opposite last page.

Classifiers size or dedust any dry material and cut points from 20 mesh to 20 microns. Details may be obtained from Dept 11-J, Buell Engineering Co.

Check 1904 opposite last page.

Fabric-filter dust collectors are delineated in four-page bulletin which includes filter-fabric charts showing temperature limits and resistance to abrasion of each of several types of fabric. Bul 150 — Air Pollution Control Division, John Wood Company.

Check 1905 opposite last page.

Permanent magnetic ferrous traps are made in one-piece cast bodies which can withstand working pressures to 150 psi and handle temperatures to 850°F. Technical and application data on the traps are available from Eriez Manufacturing Co.

Check 1906 opposite last page.

Fine perlite dust in gas to 550°F was captured in collector to eliminate an air-pollution problem. Detailed data on this hot-gas application is available from Wheelabrator Corporation.

Check 1907 opposite last page.

Oil-mist precipitators are self-contained and made in horizontal- and vertical-flow models. They are shown in four-page bulletin including drawings of typical installations in association with various types of machinery. Bul 240 — Air Pollution Control Division, John Wood Company.

Check 1908 opposite last page.

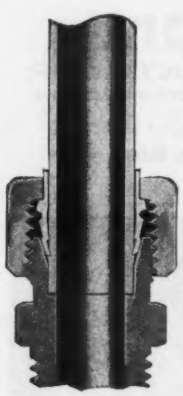
THESE PARKER TUBE FITTINGS MEET YOUR EXACT NEEDS

Processing demands specific fittings— not a "general" type

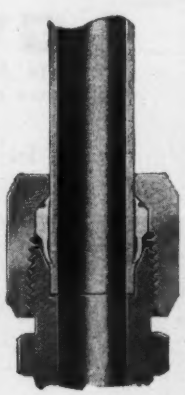
Parker covers *every* specific processing application with a fitting built for the job. There's inexpensive "Intru-lok" for instrument air . . . husky "Ferulok" for high pressures in steel and stainless steel. Both are positive, bite-type fittings. For complete corrosion resistance, new "Ridg-lok" is 100% of type 316 stainless.

Where flared tubing is used, the Parker 37° "Triple-lok" is the acknowledged leader, available in any practical metal.

For extreme temperature conditions at any pressure, "Weld-lok" combines ease of assembly and streamlined flow. "Braze-lok" withstands somewhat less heat, but is even easier to assemble and can be disassembled when necessary.



FOR INSTRUMENT AIR, use "Intru-lok®" brass and aluminum tube fittings with the captive ferrule you can't lose. For copper, aluminum, Nylon and "Parker-POL" polyethylene tubing. Simple, compact, easy to install, inexpensive. Ask for Catalog No. 4324.



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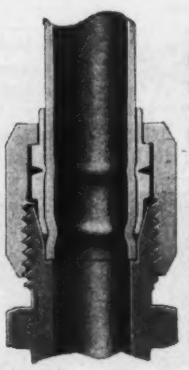
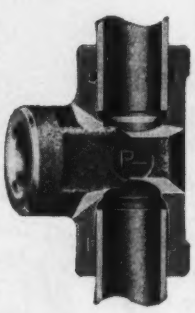


COMPLETELY CORROSION RESISTANT in stainless steel, "Ridg-lok®" has the added feature of a **REVERSIBLE FERRULE** which takes the gamble out of compression fittings assembly. Same design in brass, monel and steel. A special Teflon ferrule is available for use with glass tubing. Catalog 4323.



BRAZED JOINTS can be used where there isn't room to swing a wrench. They give you a permanent joint, yet one that can be taken apart and re-used. You just apply heat, either to make or break the joint. Parker "Braze-lok®" is completely reliable for high pressures at temperatures up to 500° F. Steel, stainless steel, Monel and cupronickel. Catalog 4375.

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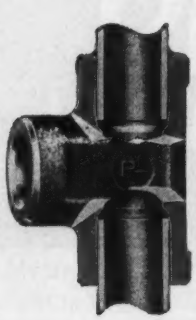

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TRENT KA KETTLES SOLVE SPECIAL MELTING PROBLEMS FOR PARAPLAST MELTERS

Rezolin, Inc., makes Paraplast—new plastic mold material used for filament winding mandrels and honeycomb-stabilizing by leading aircraft manufacturers. Trent makes KA Kettles—the melter kettles required to keep Paraplast at uniform, controlled molten temperatures up to 550°F. An automatically controlled lever pouring valve and special agitator are provided to meet Rezolin specifications. Trent KA Kettles can be "customized" to solve your special melting or heating problems.

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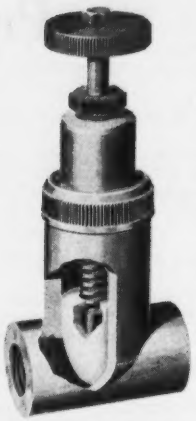
Corrosion-Resistant Throttlable Plastic Gate Valves

Write for CATALOG #42



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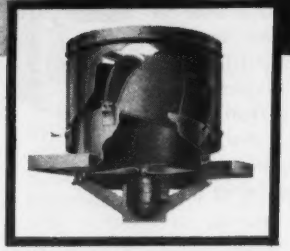

Powerful exhaust keeps out rain, snow, sleet. SKY-BLAST needs no throttling weather covers, so more air is moved at less cost. Wind velocity or direction can't affect performance. At rest, butterfly dampers form watertight seal. Other weatherproof features include: galvanized heavy gage steel surfaces . . . nonclogging rainshed . . . low wind guard . . . rugged base and condensate drain. Ratings to 78,000 CFM. Write for Bulletin 680-CP

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CURRENT LITERATURE

Scrubbers of multi-venturi wet-collector design each incorporate double-scrubbing action in which water is introduced ahead of the venturi, which forms two distinct cones for gas to pass through. They are expanded upon in W-B Scrubbers Details — Dept. 11-K, Buell Engineering Co., Inc.

Check 1913 opposite last page.

Air-pollution-control equipment, including cyclone separators, fabric filters, oil-mist precipitators, portable and self-contained dust collectors, and wet-process scrubbers are explained in four-page Bul 400 — Air Pollution Control Division, John Wood Company.

Check 1914 opposite last page.

Gyratory screens incorporate stacked-deck design. They separate materials into two, three or four products. Industrial Equipment Division, Allis-Chalmers.

Check 1915 opposite last page.

Contour scrapers, which are designed to lower cake moisture, increase disc-filter capacity and up bag life, are drawn in four-page Bul CS-102—Peterson Filters and Engineering Company.

Check 1916 opposite last page.

Self-contained dust collectors are covered in four-page bulletin, demonstrating in diagrams building-block construction concept of units. Bul 230 — Air Pollution Control Division, John Wood Company.

Check 1917 opposite last page.

Vibrating slurry screens, dry screens with dust enclosure, electrically heated screens and washing screens are available in sizes to two-ft wide and six-ft long. They can be seen in Screens Literature — Derrick Manufacturing Co.

Check 1918 opposite last page.

Air separator of 16 ft size has taken feed rate of 800 tph, containing small percentage of desired fines, and delivered 30 tph 90% 200-mesh . . . recirculating the over-size through grinding circuit. This and other models are covered in Bul 087 — Sturtevant Mill Company.

Check 1919 opposite last page.

Flooded-plate and flooded-bed scrubbers are treated in two four-page bulletins including lists of applications. Buls 170 and 160, respectively — Air Pollution Control Division, John Wood Company.

Check 1920 opposite last page.

Permanent grate magnets are indexed in catalog available from Eriez Manufacturing Co.

Check 1921 opposite last page.

Size Reduction

Electric mill drive in recent full-load demonstrations showed efficiencies of 98.5%. Twinducer Mill Drives — Industrial Equipment Division, Allis-Chalmers.

Check 1922 opposite last page.

Insecticide flaker, which is 36" in diameter and 48" long, has internally jacketed stainless-steel drum and steam-jacketed stainless-steel feed pan. It has variable-speed drive through gear and pinion and manual adjustment for knife holder. This is only one of models considered in Flakers Information — Goslin-Birmingham Manufacturing Co., Inc.

Check 1923 opposite last page.

Pelletizers and dicers which incorporate shear-cutting action are taken up in two publications put out by Taylor, Stiles & Company.

Check 1924 opposite last page.

Pulverizers incorporate pulverizing principle in which particles are impacted against themselves in two opposing streams of compressed air or steam. Particles of proper size are then carried upward and out of mill by an air stream. Oversize particles are returned for further reduction. Additional data is incorporated in Jet Pulverizers Information—Majac, Inc.

Check 1925 opposite last page.

Lever-type pulverizers are designed to crush the hardest materials ¼" to dust in one operation. They are covered in Reliance Literature — Universal Road Machinery Co.

Check 1926 opposite last page.

Pelletizing slurries and concentration solutions is function of process which is designed to produce uniform homogeneous, symmetrical pellet in any desired size range without utilizing prilling. Data and flow sheets on this process are contained in Spherodizer Brochure —The Chemical and Industrial Corp.

Check 1927 opposite last page.

Pulverizer-classifiers are available in two sizes—24" with 60- or 75-hp motor and 30" with 100- or 125-hp motor. They are depicted in Hurricane Literature—The Bauer Bros. Co.

Check 1928 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Steam trap dependability is a matter of what the manufacturer puts into the trap

ARMSTRONG TRAPS ARE DESIGNED AND MADE TO GIVE YOU DEPENDABILITY

1. Efficient, proved operating principle

Armstrong Traps provide the most advanced development of the time-proven inverted bucket principle. Simple, but effective, there isn't much that can go wrong.

2. Good design

Armstrong Trap design gives big capacity in a small package. The mechanism is virtually fool-proof. All body styles are easy to inspect and maintain without removal from the line.

3. Highest quality materials of construction

Only the best goes into Armstrong Traps. Bodies are close grained 30,000 tensile iron castings or high quality forgings. Working parts are all tough, corrosion resistant stainless steel.

4. Good workmanship

Armstrong Traps are made by craftsmen who take pride in their work. Careful inspection and frequent checking insure the quality of the trap.

5. Application know-how

Your problem has probably been solved already in the extensive experience of the Armstrong engineering and sales organization. You can be sure of sound, dependable recommendations.

Your local Armstrong Representative can show you what Armstrong dependability can do for you. Call him today or write direct.

860 Series for low pressure heating service.

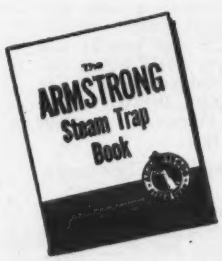
800 Series, side inlet, side outlet.

No. 801, side inlet, bottom outlet.

880 Series, integral strainer.

200 Series, bottom inlet, top outlet.

Forged Steel Series for high pressures, high temperatures.



The 48-page Armstrong Steam Trap Book tells how to correctly size, install and maintain steam traps for any pressure, any temperature, any load plus full catalog data on Armstrong Steam Traps. Ask for Catalog K.

ARMSTRONG MACHINE WORKS

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"See our catalog in Chemical Engineering Catalog"

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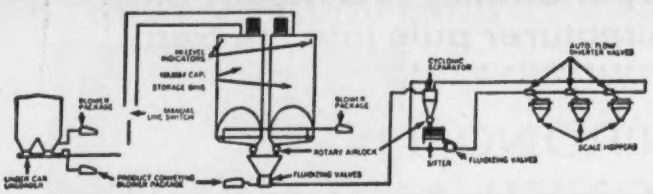
Check 1929 opposite last page.



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Systems are custom engineered for maximum bulk handling efficiency with long, maintenance-free service. A complete range of line sizes and capacities are available. For free catalog showing system layouts, write:

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Check 1930 opposite last page.

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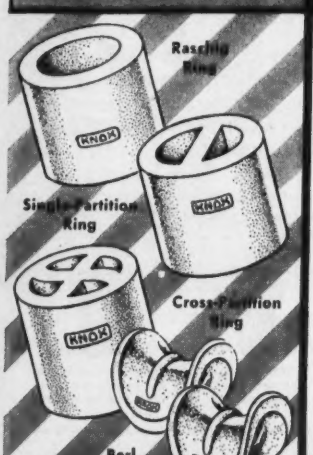
OUTSTANDING QUALITY
TOWER PACKINGS
DESIGNED for SERVICE!



Finest Materials — PLUS — More than 39 Years of Production Experience

- √ Modern production techniques assure non-porous tower packings.
- √ Uniform quality — high chemical purity — iron free — great mechanical strength — will not crumble.
- √ Wide range of designs, with adequate stocks maintained for emergencies.
- √ Better Tower Packings at lower operating costs. Prices and samples will be sent on request.

IRON FREE

Always Specify KNOX Tower Packings

KNOX PORCELAIN CORPORATION
KNOXVILLE 1, TENNESSEE

Check 1931 opposite last page.

CURRENT LITERATURE

Ball, pebble, jar and jar-rolling mills are subjects of Ball & Pebble and Jar Mills & Jar Rolling Mills Cats — Paul O. Abbe Inc.

Check 1932 opposite last page.

Laboratory Apparatus

Helipath stand which permits testing, study and control of highly plastic materials regardless of degree of thixotropy, is an accessory for use with manufacturer's viscometer. It is specified on Data Sheet 051-B — Brookfield Engineering Laboratories, Inc.

Check 1933 opposite last page.

Laboratory recording-indicating viscometer is presented on single-page Bul RL100 — Viscosel Corporation.

Check 1934 opposite last page.

Testing-sieve standards which have been set by ASTM, NBS and ASA are in planning stage for world-wide adoption. All of these specification data are incorporated in Bul F-S-61 — Newark Wire Cloth Company.

Check 1935 opposite last page.

pH meter uses two high-purity metal electrodes which test both liquids and semi-solid matter. Kelway pH Meter — Dept. CP-1, Kel Instruments Co., Inc.

Check 1936 opposite last page.

Laboratory equipment for safety, including storage and dispensing cans, safety tilt-can assemblies, disposal cans, and stainless-steel drum faucets, are all reviewed in "Red Book" — The Protectoseal Company.

Check 1937 opposite last page.

Drying and Heating

Water-tube boilers each occupy 40 sq ft of floor space and are available in sizes of 8 to 150 hp. Modulatic Boilers — Dept. 3-K, Vapor Corporation.

Check 1938 opposite last page.

Combination rotary calciners and coolers can work with temperatures to 2200°F and usually can cool materials to 200°F before discharge. For complete story, see Bul 118-R—Dept. B-110, Process Engineering Division, Bartlett-Snow-Pacific, Inc.

Check 1939 opposite last page.

Standard heat exchangers and specially constructed models are presented in Bul HE-8 — Dept. 24A-XCP — Henry Vogt Machine Co.

Check 1940 opposite last page.

Plate-type heat-exchange coil is topic of Bul P54-Platecoil Division, Tranter Manufacturing, Inc.

Check 1941 opposite last page.

Four heat exchangers recently produced for acetic-acid distillation were an acid-recovery cooler, an acetic flashing-column condenser, and two acid-recovery subcoolers. These and other exchangers are taken up in Exchangers Information — Goslin-Birmingham Manufacturing Co., Inc.

Check 1942 opposite last page.

Steam or air super heaters maintain temperatures to within ±9°F. Dept. 3-K, Vapor Corporation.

Check 1943 opposite last page.

Engine-jacket water coolers, air coolers, and shell & tube heat exchangers are subjects, respectively, of Cats 1356, 1652, and 1261 & 1160 — Dept K-371 — Young Radiator Company.

Check 1944 opposite last page.

Forced-circulation hot-oil heater can produce temperatures to 600°F without pressure. Specifications are included in Hi-R-Temp Oil Heaters Information — Dept. 3-K, Vapor Corporation.

Check 1945 opposite last page.

Electric-heating mantles, their laboratory applications, their industrial uses, and special applications of them, are the four subjects covered, respectively, in the publications, Sections 1 through 4 — Dept. CP, Glas-Col Apparatus Company.

Check 1946 opposite last page.

Drying machinery and equipment are available for a variety of applications. The National Drying Machinery Co.

Check 1947 opposite last page.

Electric immersion heaters are designed for high-temperature/high-pressure applications. They are provided with standard 150-psi flanges. Special flanges withstand pressures to 4500 psi. Heaters are detailed in Cat 60 — Edwin L. Wiegand Company.

Check 1948 opposite last page.

Refractory heat exchangers incorporating trefoil construction have proved themselves in several installations. Harbison-Walker Refractories Company.

Check 1949 opposite last page.

Kilns, mills and crushers are included in process-equipment line of Traylor Engineering & Manufacturing, Division of Fuller Company, Subsidiary of General American Transportation Corporation.

Check 1950 opposite last page.

Chemical Materials

Silicone defoamers are available for variety of products and systems, whether they be oil, aqueous of food. Complete explanation is contained in Silicone Defoamers Data — Dept. 2723, Dow Corning Corporation.

Check 1951 opposite last page.

Chlorinating agents, including phosphorus trichloride, are subject of Bul 328-B—Hooker Chemical Corporation.

Check 1952 opposite last page.

Polyvinylidene chloride latex is resistant to oil and grease and non-reactive to concentrated acids, solvents, alkalies and other corrosive materials. Information on the material is published by National Starch and Chemical Corporation.

Check 1953 opposite last page.

Cyclohexanone is powerful solvent for vinyl resins with slow evaporation rate and flash point of 123.8°F, and low vapor pressure. Its properties are considered in 32-page Tech Bul I-19—National Aniline Division, Allied Chemical Corporation.

Check 1954 opposite last page.

Phosphorus trichloride distills 97% between 74.5 to 78.0°C. Its properties are tabulated in Phosphorus Trichloride Data—Hooker Chemical Corporation.

Check 1955 opposite last page.

Polypropylene has been successfully used in magnifier-projector which is portable, virtually unbreakable and immune to staining. Pro-fax Polypropylene — Hercules Powder Company, Incorporated.

Check 1956 opposite last page.

Muriatic-acid data sheet includes dilution table telling how much of acid is needed to make up solutions of various strengths. Muriatic Acid Data Sheet—Hooker Chemical Corporation.

Check 1957 opposite last page.

Methyl and ethyl acrylates containing 15 ppm monomethyl ether of hydroquinone are now available in commercial quantities. Literature on this development is available from Dept. SP-29, Rohm & Haas.

Check 1958 opposite last page.

Silicone release coating on papers eases handling of sticky products. It is topic of Syl-off Coatings Information — Dept. 2722, Dow Corning Corporation.

Check 1959 opposite last page.

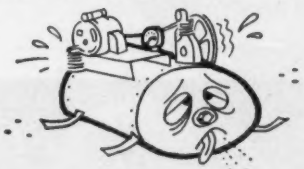
ONE OF A SERIES OF CHATS ABOUT THE CONSERVATION AND CONTROL OF HEAT

SARCO TOPICS

PREVENTION OF CRUELTY TO OLD COMPRESSORS

You've got at least one air compressor, of course. Doesn't everybody? And there it sits, pumping its heart out for you year in and year out. And you there, Simon Legree, do you ever give it a break and measure its capacity?

One measure is the useful work done by your compressed air tools, of course. However, this yard stick may make your compressor installation seem way oversize, but don't blame the equipment. The puffing oldster isn't responsible for choked intake filters, poorly designed suction pipes,



overcooling, undercooling, inadequate distribution mains and wet air. All these things can cost you.

Off and on we're going to talk about compressors in these pages, if you don't mind. It's a big subject and the lesson for today will be confined to the air intake. Can you imagine a more logical place to start?

Where to locate the intake? Easy. Where the atmosphere is clean and cool and dry. Dirty air and grit choke filters and eventually get through to cause wear. The cooler the air, the more you can compress per revolution. You'll get 10% more air delivered at 40°F. than at 90°F. And dryness is imperative, because compressed air can't contain all the moisture it can hold in its uncompressed state. Where does the moisture go? Into mains, tools, and valves, unless it's removed. And need we add that chemical fumes cause corrosion? That includes exhaust gases from engines and furnaces. CO_2 in the presence of oxygen and moisture can rust your valves, tools, nozzles and sprays.

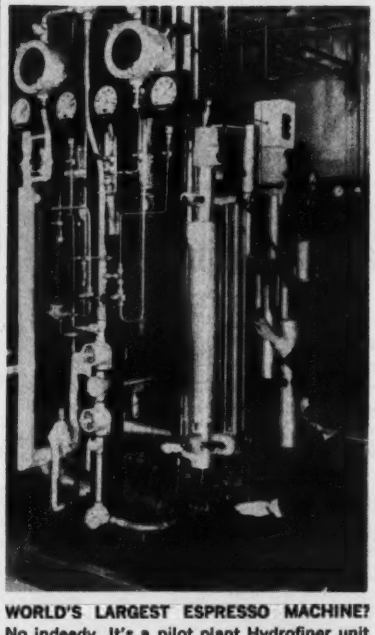
How about intake size? Keep pipes short, sized right, and straight as possible. Small pipes with snaky bends reduce pressure and capacity. For an educated example, a pressure loss due to friction in the intake pipe and filter of 2 psi (14.7 to 12.7) will reduce output of a 125 psi compressor by 7.5%.

How do we know so much? Well, as we continue in future issues, we'll be talking drains and traps and cooling and safety controls for compressors—all of which we manufacture. That's how we know so much. If you can't bear to wait, just write. It's that easy to get information out of us.

SARCO AND THE FLYING DUTCHMAN

In the pipe shop of a major office building complex on New York's east side, the Flying Dutchman flies again. This is really a bright idea which could well become standard practice elsewhere, because it's the kind of logical precaution that would make sense anywhere.

The chap in our photograph is putting together, according to precise, dimensioned drawings, an assembly consisting of a Sarco Thermo-Dynamic Steam Trap, Type TD-50, a Sarco strainer, and valves and fittings for stock. The assemblies will be used for quick and easy replacement in the event of failure or any possible maintenance requirement in the steam distribution system, the heating system, or the air conditioning system.



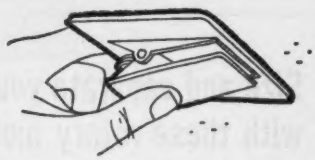
WORLD'S LARGEST ESPRESSO MACHINE?

No indeedy. It's a pilot plant Hydrofiner unit built by The Lummus Company at its Engineering Development Center in Newark, New Jersey. And its presence here is due to the fifteen ¾" Sarco Thermo-Dynamic Steam Traps which vent and drain its 35 pound tracer lines plus a ½" TD-50 as a main drip. Nice to be picked for projects like this. Makes us proud.

We'd like to be able to report that this plan recently saved thousands of people from freezing or roasting during a crisis. So far, however, the assemblies have proved to be an ornamental kind of insurance policy. Alas, there have been no failures. That dog-goned Sarco performance is just too reliable for its own good.

WE'VE GOT THINGS TO GIVE AWAY

First of all, we have a new spring clip to hold together a bunch of papers on your desk, or something. It's not complicated, but it is difficult to describe, so we've gone to the tremendous expense of having our local Michaelangelo sketch it here. If you have no papers to hold together, it makes a rather delightful snapping noise that might amuse you. Oh yes—it also has a cross section of a TD-50 steam trap printed on it which actually *moves* when you wiggle your eyeballs at it. In case you *still* don't know how a TD-50 works, this is for you.



Second, we've still got engineers' sketch pads which we enjoy giving away so much we're offering them again. In case you're new here (Hello!) they contain isometric grid paper for use by anyone involved in piping or hookup sketches for process or heating applications.

And the famous Sarco key chain, which is really exactly that—a chain—about 60 times as handy as a fat case, we're offering again too. This has a TD-50 replica attached, but detachable. Call it tawdry promotion if you will, but our super-aesthetic wife wears one proudly around her neck.

All of these are available from your Sarco representative. Or, if he's out, write in.

There's really no reason to keep this conversation one-sided. After all, we're both interested in these subjects or you wouldn't have read this far. So write, even if it's only about a difficult problem. 7824

SARCO COMPANY, INC., 635 MADISON AVE., NEW YORK 22, N.Y.

STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS • HEATING SPECIALTIES

SARCO

Check 1960 opposite last page.

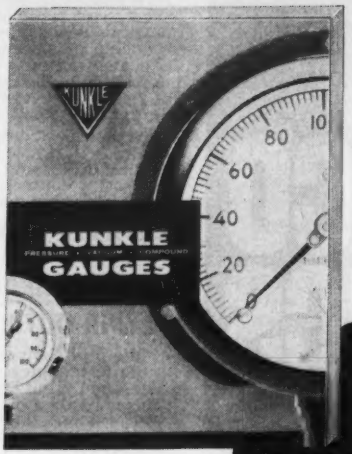
DELAVAN CARBIDE SPRAY DRYING NOZZLES LAST LONGER

Tungsten carbide orifice plus patented swirl chamber combine to give you a longer lasting, better performing nozzle. Flow rates and spray angles are certified – your assurance of performance as rated. For full facts on the Delavan SDX (illustrated) and others, write for Catalog SD-1 and SD-2.

DELAVAN Manufacturing Company
WEST DES MOINES, IOWA

Canadian Representative
ONTOR LTD., 12 Leswyn Road, Toronto 19, Ont., Canada

Check 1961 opposite last page.



KUNKLE

GAUGES

FOR PROCESS AND POWER INSTRUMENTATION

Engineering data makes specifying the right gauge quick and easy

New COMPREHENSIVE CATALOG AVAILABLE ON REQUEST

COMPLETE LINE

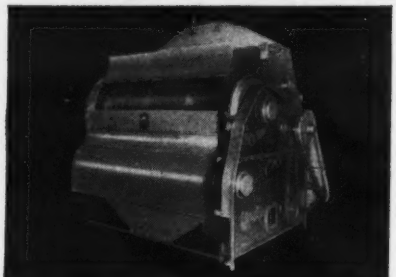
- Ranges from 15 p.s.i., or 30 inches of vacuum, to 20,000 p.s.i. in bronze, stainless steel and other alloys.
- Low pressure and liquid level bellows-actuated gauges.
- Missile and rocket GSE gauges.

KUNKLE VALVE CO,. INC. 121 SO. CLINTON ST. FORT WAYNE, INDIANA

Check 1962 opposite last page.

Size and separate your materials the modern way with these rotary motion Simon-Carter machines

The *rotary* motion principles employed in Simon-Carter machines are far more efficient and accurate than flat surface screening methods. For length sizing or separating, pockets or indents are used. For thickness or width sizing or separating, perforated cylinders (*that stay clean*) are used. All machines are compact in relation to capacity, and are of all-metal construction. Write today for complete information and descriptive booklets. Free laboratory testing and demonstrating service.



CARTER SCALPERATOR
Coarse materials are carried over the top of a rotating wire mesh screen. Fine materials are drawn out by suction. The Carter Scalperator is used for cleaning material as it is shipped or received. Another all-rotary-motion machine.

CARTER PRECISION GRADER
Separates and sizes free-flowing granular materials by *thickness* and *width* differences.

CARTER DISC SEPARATOR
Unexcelled for accurately separating and sizing free-flowing granular materials by *length* differences.

STOP BY AT THE CHEM SHOW! We'll have our machines operating — Booth 898

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677 19th Avenue N. E. • Minneapolis 18, Minnesota

"See our exhibit at the Chem Show"

Check 1963 opposite last page.

CURRENT LITERATURE

Vinyl-acrylic copolymer latex which is self-crosslinking reportedly improves water, solvent, and heat or creep resistance. Its properties are covered in X-Link 2833 Information — National Starch and Chemical Corporation.

Check 1964 opposite last page.

2-Nitropropane has solvent property permitting use of larger proportions of low-cost alcohols and aromatics in solubilizing variety of coating materials, dyes, organic chemicals, fats and oils. Properties are expanded upon in 2-Nitropropane Data-Nitroparaffins Department, Commercial Solvents Corporation.

Check 1965 opposite last page.

Phenol assay is typically over 99.5% by bromination. The material, which meets or exceeds requirements of U.S. Pharmacopoeia XV, is covered in Phenol Data Sheet—Hooker Chemical Corporation.

Check 1966 opposite last page.

Fluids Handling

Thermostatic steam traps are available for almost every trapping job, for pressures of vacuum to 300 psig and capacities to 25,000 lb/hr. Barnes & Jones, Inc.

Check 1967 opposite last page.

Jacketed pipe, valve and fittings are available in variety of materials in sizes of 1¼ to 8". Jacketed Pipe — Process Heating Department, Parks-Cramer Co.

Check 1968 opposite last page.

Plain-end-pipe couplings and fittings are available to join standard or light-wall carbon- or stainless-steel, aluminum and other pipe materials. Plainlock Couplings and Fittings—Victaulic Company of America.

Check 1969 opposite last page.

Rotary joints are available in various types, sizes and styles for many purposes. They are tabulated in Rotary Joints Cats—Barco Manufacturing Co.

Check 1970 opposite last page.

Couplings permit quick addition or removal of relief valves, flow-control valves, and check valves in permanent hydraulic pipe installations. Details may be obtained from Snap-Tite.

Check 1971 opposite last page.

Spray-nozzle information is available in form of a catalog and installation information is tabulated in series of data sheets. Cat 24 and Data Sheets — Spraying Systems Co.

Check 1972 opposite last page.

CURRENT LITERATURE

Ductile-iron pipe fittings are available unlined or lined. They are expanded upon in Ductile-iron Fittings Details—The Kuhns Brothers Co.

Check 1973 opposite last page.

Pipe-fabrication standards include 13 sections on such topics as machining backing rings for butt welds, dimensioning welded assemblies, arc-welding dissimilar ferritic steels and affixing permanent symbols to pipe. Pipe Fabrication Standards—The Pipe Fabrication Institute.

Check 1974 opposite last page.

Steam traps are topic of T-44 Literature — Sarco Company, Inc.

Check 1975 opposite last page.

Spray nozzles are available in orifices of 0.025 to 1-13/16"; hollow-cone, full-cone, standard and wide angle, and round and flat patterns; and capacities of 0.15 to 230 gpm. More data is contained in Bul 5900—Binks Manufacturing Company.

Check 1976 opposite last page.

Spray nozzles each incorporate tungsten-carbide orifice and swirl chamber. They are depicted in Cats SD-1 and SD-2 — Delavan Manufacturing Company.

Check 1977 opposite last page.

Teflon pipe-thread tape is packaged in clear-plastic boxes in ¼, ½, ¾ and 1" x 288" rolls and also in ½ x 576" rolls. Additional description is contained in Thred-Tape Information—Crane Packing Company.

Check 1978 opposite last page.

Steam-trap selection and sizing, installation, and maintenance are the topics of a 44-page Steam Trap Book — Armstrong Machine Works.

Check 1979 opposite last page.

Steam traps are available in models for average, extra-heavy and light-to-moderate condensate loads. These are all reviewed in Bul T-1743—Yarnall-Waring Company.

Check 1980 opposite last page.

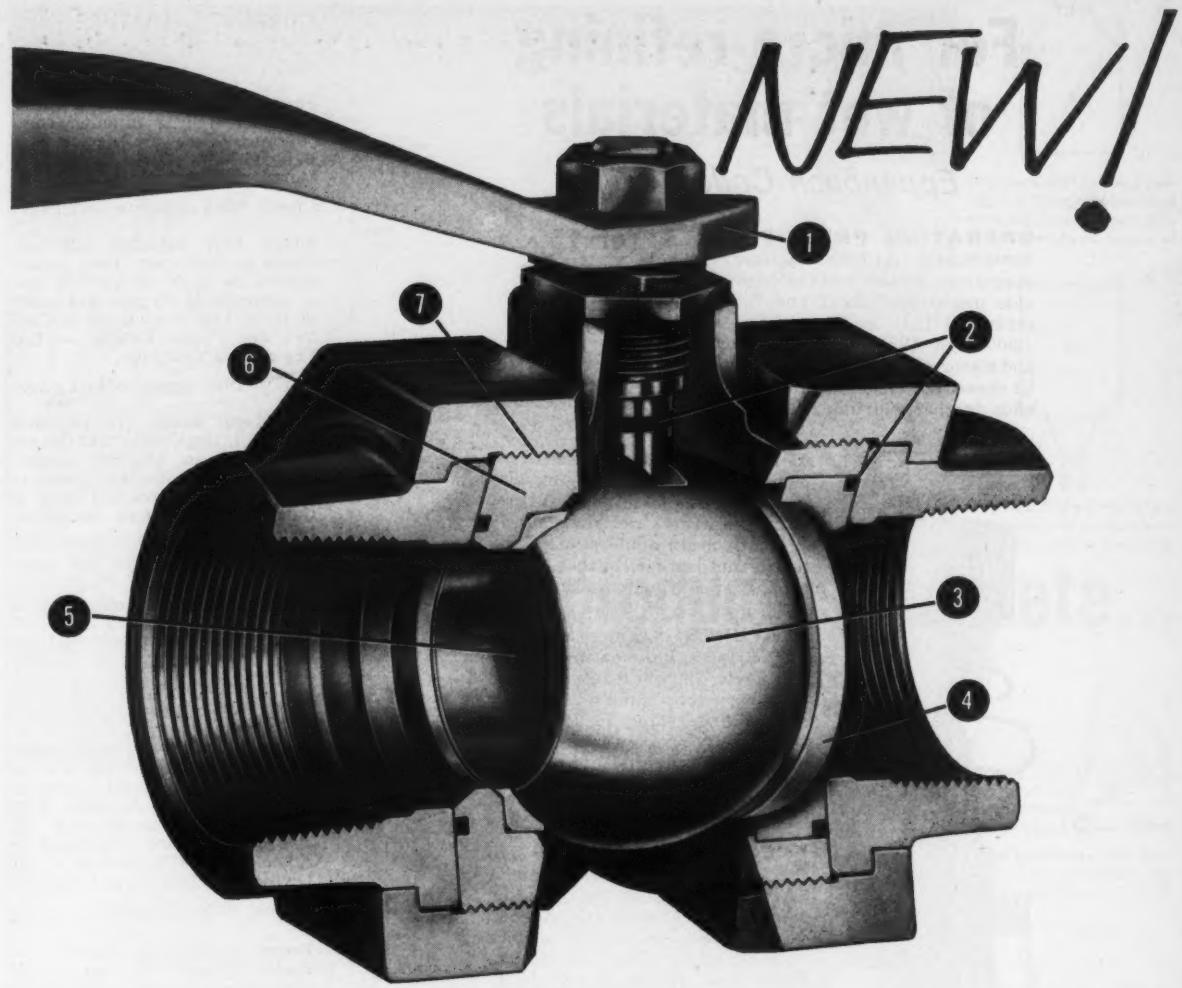
Pumps

Centrifugal and diaphragm-type pumps are subject of information published by Dorr-Oliver Inc.

Check 1981 opposite last page.

Leakproof pumps can handle practically any solids-free solution. Electric-Cand Pumps — Industrial Equipment Division, Allis-Chalmers.

Check 1982 opposite last page.



PETRO® BALL VALVE

FEATURES DOUBLE UNIONS AT NO EXTRA COST!

After years of thorough research and testing, Clayton Mark has introduced its new PETRO BALL VALVE—with outstanding engineering features and built-in performance, which makes it singularly attractive to almost every piping and valve application. The essence of simplicity, the valve body can be removed without disturbing any other part of the piping . . . in just 13 seconds! The PETRO BALL VALVE is designed with features that make it definitely superior to other valves: ① easy quarter-turn improved handle, ② completely contained seals, ③ floating ball gives tighter seal, ④ interchangeable dual seats, ⑤ largest port opening, ⑥ rust-proof one-piece forging and ⑦ cadmium-plated nuts. And remember—*each and every PETRO BALL VALVE is air-tested under 100 pounds pressure to assure perfect operation.*

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PUMPS · WATER WELL SUPPLIES · CONDUIT · UNIONS · TUBING

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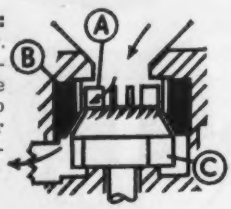
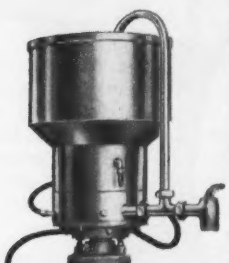
Check 1983 opposite last page.

For micro-refining of wet materials

Eppenbach Colloid Mills

OPERATING PRINCIPLE: Rotor blades (A) break-up slurry. Serrations in rotor and stator provide mechanical shear and force material into adjustable gap (.0005" to .125") between rotor and stator (B) for intense hydraulic shear. Lower part of rotor (C) adds further whirling action.





VT-11

APPLICATIONS: Cosmetics, pharmaceuticals, foods, gum dispersions, insecticides, paints, paper coatings, polishes, plant extracts, resin dispersions, inks, textile and leather finishes, soaps, asphalt or silicone emulsions, etc.

FEATURES: Stainless steel contact surfaces. Ball bearings, whipless shaft. Pumping action. Parts for 3-piece rotor and 2-piece stator available separately for low maintenance. By-pass or recirculating assembly. Jacketed hopper and homogenizing zone. Calibrated micrometer gap adjustment.

SPECIAL MILLS: *Micro-Mill* for lab study of products under "Applications" also wet grinding fibrous tissue, bacilli, spores, mold, yeast, pollen, etc., in 150 ml to 2 liter quantities. Includes recirculating pipe, jacket, removable internal cooling coil. Also serum mills. Pressure head and horizontal or portable mounting available.

LAB, PILOT AND PRODUCTION MILLS. Typical sizes:

Model	hp	rpm*	rotor diam.	gal/hr**
QV-6	¼	8000	2"	to 10
VT-7-2	1½	7200	2.5"	to 60
VT-8	3	3500	4"	to 75
VT-10	10	3500	6.25"	to 200
VT-13	50	3500	8.5"	to 1000

*Also higher-speed belt-driven models.

**For comparison only. Actual output ranges from 50% to 200% of figures shown.

MICRO MILL

Micro-refining with an Eppenbach often improves both product and process. Refining agglomerates in a mix, for example, may improve stability and appearance (shine), speed chemical reaction through greater surface area and reduce amount of emulsifying agent.

The easy-to-set, micromatic gap control allows aecurate, systematic reproduction of emulsions or suspensions.

We will be glad to run trial batches of your material at our laboratory—or have an Eppenbach engineer call. Ask about our Rental Plan.

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Dept. CP11 • Eppenbach Division • Hudson, N. Y.

"See our exhibit at the Chem Show"
Check 1984 opposite last page.

CURRENT LITERATURE

Pump cups are available in 100% Nylon as well as in other compositions. They are depicted in Bul 5903 — Darling Valve & Manufacturing Co.

Check 1985 opposite last page.

Pumps have impellers fully enclosed or semi-open. They handle slurries to 1/16" in particle size at capacities to 50 gpm and heads to 50 ft. Line is reviewed in Centri-Chem Pumps Details — Eco Engineering Company.

Check 1986 opposite last page.

Centrifugal pumps for pressures to 21 psi, single-stage and 70 psi, multi-stage, are available, respectively, for capacities to 70 and 10 gpm. They are specified fully in Cat 130 — Eastern Industries, Incorporated.

Check 1987 opposite last page.

Progressing-cavity pumps, which are available in capacities to 500 gpm for pressures to 1000 psi, are written up in Bul 100-CP — Robbins & Myers, Inc.

Check 1988 opposite last page.

Totally enclosed hermetic pumps can be taken apart and put together with open-end wrenches and a screwdriver. Available in 13 sizes with one- to five-inch discharges, they are considered in Advance Bul 977—Buffalo Pumps Division, Buffalo Forge Company.

Check 1989 opposite last page.

Pump engineering manual includes 40 pages of data in tabular and graphical form, including information gathered from variety of sources such as manufacturers' data, engineering handbooks, practical experience and laboratory tests. Engineering Manual EM-611 — Marlow Pumps, Division of Bell & Gossett Company.

Check 1990 opposite last page.

Vertical sump pumps have no packings, mechanical seals or submerged bearings. The Galigher Co.

Check 1991 opposite last page.

Stainless-steel jacketed pumps are available in six sizes in 10- to 110-gpm range. Additional information is tabulated in Folder SP 537CC — Viking Pump Company.

Check 1992 opposite last page.

Packaging

Bagger handles 24 bags per minute of 25-, 50- or 100-lb open-mouth paper or textile type. Speedac Baggers—Richardson Scale Company.

Check 1993 opposite last page.

Plastic liners for steel drums, fibre containers, cartons and boxes are available in all sizes and styles in polyethylene and all flexible films. They are presented in manual, "Facts and Figures" — Protective Lining Corp.

Check 1994 opposite last page.

Combination bag packer and placer automatically hangs bags on packing spout and fills them at rate of 25 per minute. They are discussed in Bag Packer-placer Details — Raymond Bag Corporation, Division of Albermarle Paper Mfg. Co.

Check 1995 opposite last page.

Multi-wall bags have easy-opening tab. Bemi-Strip Bags — Bemis Bro. Bag Co.

Check 1996 opposite last page.

Valves

Steel gate valves are available in 150- and 300-psi lines for all services at temperatures to 1000° F, in sizes of ½ to 2". Additional details on the valves may be obtained from Dept. E, Industrial Products Group, Crane Co.

Check 1997 opposite last page.

Ball valve incorporates Teflon sealing capsule permanently molded about metal ball with integral stem — W-K-M, Division, ACF Industries.

Check 1998 opposite last page.

Ball valves incorporate lip seals. They are topic of Ball Valves Facts — Jamesbury Corp.

Check 1999 opposite last page.

PVC ball valves are built to last 250,000 cycles. They are detailed in Bul 196 — Walworth Co.

Check 2000 opposite last page.

Non-lubricated three-way valves each incorporate special tempered pure-Teflon sleeve with tapered plug and sculptured interior body bore. Tufline Valves — Continental Manufacturing Co.

Check 2001 opposite last page.

Check valves can be utilized in almost any standard-type fitting. They are pictured in four-page bulletin which shows various ways basic unit can be installed in different fittings. Form 300C — Durabla Manufacturing Company.

Check 2002 opposite last page.

Ball valves each have double-union ends, dual interchangeable seats, cadmium-plated nuts and one-piece-forging construction. Petro Ball Valves—Clayton Mark and Company.

Check 2003 opposite last page.

Plug valves each have plug coated with lubricating film permanently bonded to metal surface of plug. Available in all sizes for all pressures, valves are discussed in booklet, "Pocket Valve Guide" — Rockwell Manufacturing Company.

Check 2004 opposite last page.

Gate valves, which incorporate one-piece split-disc gate which flexes and gives to stay mated to the seat in spite of body distortion, are subject of Living Wedge Valves Details — Walworth Company.

Check 2005 opposite last page.

Flange ball valves are available size range of ¼ through 6". Seat and seal materials are Buna-N, Teflon and Neoprene. (Other materials are available.) They are listed in Econ-O-Miser Information—Worcester Valve Co., Incorporated.

Check 2006 opposite last page.

Globe valves for 150-psi service are available in sizes of two inches and larger and incorporate non-rotating stems and non-rising handwheels with disc assemblies pinned to stems. Full information on these valves is contained in Bul 7 — Alloy Steel Products Company, Inc.

Check 2007 opposite last page.

Ram-type drain valves are each designed so that, in closed position, piston or ram extends up into tank to prevent outlet plugging. Full story is contained in Drain Valves Cat — Strahman Valves Inc.

Check 2008 opposite last page.

Bar-stock valves are designed for pressures to 10,000 psi in steel. Also available in bronze and carbon and stainless steels, they are taken up in Bar-stock Valves Details — R-P&C Valve Division, American Chain & Cable Company, Inc.

Check 2009 opposite last page.

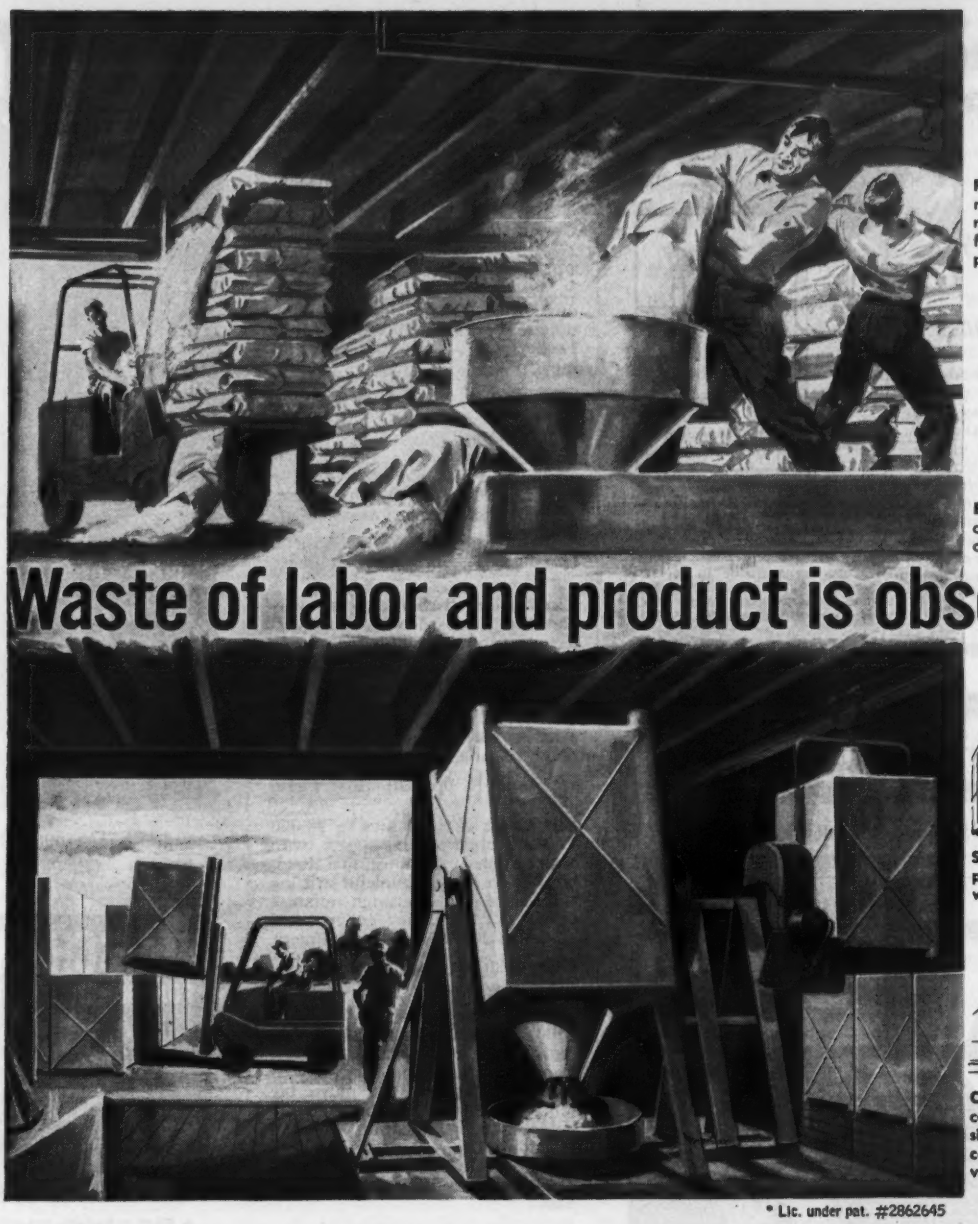
Plug valves in air-conditioning and heating systems are topic of bulletin showing ten different uses of the valves in these applications. Bul AP-1059 — W-K-M Division, ACF Industries, Inc.

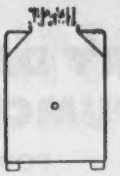
Check 2010 opposite last page.

Materials Handling

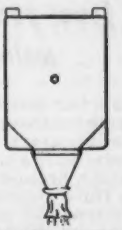
Bulk-material portable pneumatic transfer unit is designed to handle wide range of dusty materials. Airveyor Transfer Units — Fuller Company, Subsidiary of General American Transportation Corporation.

Check 2011 opposite last page.





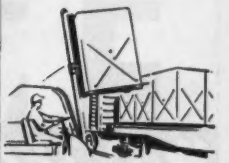
Fills Fast—22" opening permits fast filling of powdered materials. Internal cone conforms to angle of repose of product.



Empties Clean—Internal cone funnels all materials out of bin. No residue remaining.

Waste of labor and product is obsolete...

Stores Outdoors—Weatherproof, turns yard area into warehouse. Stacks 2 high.



Cuts Shipping Costs—low cost flat-bed equipment considered part of special rail car with "freight free" advantages.

* Lic. under pat. #2862645

Waste of labor, product, floor space, time is now outmoded—eliminate it in your plant today.

Powell's new Invert-a-bin* Semi-Bulk Handling System has put an end to the biggest headache in handling granular products. These sturdy, easy-to-handle steel or aluminum containers are easy to fill and easy to empty. Weatherproof, they can be stored outdoors freeing indoor storage areas for production.

Ideal for inter-plant or intra-plant these units are considered part of special rail car with "freight free" advantages. Due to the simplicity of design, maintenance of the Invert-a-bin* is nil.

Why continue losing time and money with old style disposable packages when this remarkable new Invert-a-bin* is immediately available on either lease or purchase. Write for literature today!

THE POWELL PRESSED STEEL COMPANY

Dept. 701-11 • Hubbard, Ohio

Visit our Booth #1451 at the Chemical Exposition

Check 2012 opposite last page.

TRY DARCOVA PUMCUPS

FOR

- *Higher pump efficiency*
- *Lower pump maintenance*

Cross-section of the conventional and 45° bevel type Pumcups

IT'S a fact that hundreds of reciprocating pump and cylinder users today are standardizing on Darcova Pumcups because they eliminate fluid slippage, costly down-time and maintenance!

It's easy to check these claims right in your own plant. Behind this exceptional Darcova Pumcup performance lies texture-engineering and cup design that conform precisely to pressure-temperature-fluid conditions.

Pumcups of various types are available in a complete range of sizes and texture-engineered compositions for your reciprocating pump and cylinder requirements.

Pumcups are available in Nylon as well as other texture-engineered compositions. Write for your copy of Bulletin No. 5903.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

DARCOVA TRADE MARK PUMCUPS

Check 2013 opposite last page.

FREE

WHYTEKOTE LUBRICANTS

A revolutionary new line of non-staining white lubricants

- Excellent lubricity under extreme loads
- Solids lubricate to 2000°F
- Non-staining
- No metal fillers
- Easy to apply

Send for free Sample tube today!

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65 Harvard Ave. • Stamford, Conn. • Fireside 8-3724
Plants in Stamford, Conn., London, Munich and Strasbourg

"See our exhibit at the Chem Show"
Check 2014 opposite last page.

CURRENT LITERATURE

Collapsible material handling containers are made of cord fabric and synthetic-rubber compounds. They are topic of Sealdbin Facts — Transportation Products Dept., United States Rubber.

Check 2015 opposite last page.

Vibratory feeders have totally enclosed drive elements for hazardous, dusty, wet or corrosive conditions. They are indexed in Hi-Vi Feeders Cat — Eriez Manufacturing Co.

Check 2016 opposite last page.

Bulk-handling railroad cars can be unloaded by any means of conveying. Airslide Cars — Airslide and Dry-Flo Car Division, General American Transportation Corporation.

Check 2017 opposite last page.

Circular-bin discharger, conveyor-elevators, closed-belt conveyor-elevators, and natural-frequency vibrating conveyors are taken up, respectively, in Buls 250, 358, 349 and 353. Also, belt conveyors are considered in a catalog by the same name Engineering Division, Stephens-Adamson Mfg. Co.

Check 2018 opposite last page.

Lift trucks in capacities to 10,000 lb each incorporate engine with crater-shaped combustion chamber which sets-up violent swirling turbulence for thorough mixture of air and fuel. They are specified in Bul BU-680 — Allis-Chalmers.

Check 2019 opposite last page.

Tractor-shovels each combine 2500-lb capacity, six-ft turning radius, full-power-shift transmission, power steering, and power-transfer differential to move big tonnages. These are dilineated in publication, "Industrial Material Handling from A to Z" — The Frank G. Hough Co., Subsidiary of International Harvester Company.

Check 2020 opposite last page.

Materials-handling and processing equipment . . . including pneumatic conveyors; pumps, blowers, feeders and cyclones; horizontal mixers; knife cutters; saw-tooth crushers; gyro sifters; attrition mills; hammer mills and pulverizers; and other equipment . . . are covered in four-page Bul 102 —The Young Machinery Company, Inc.

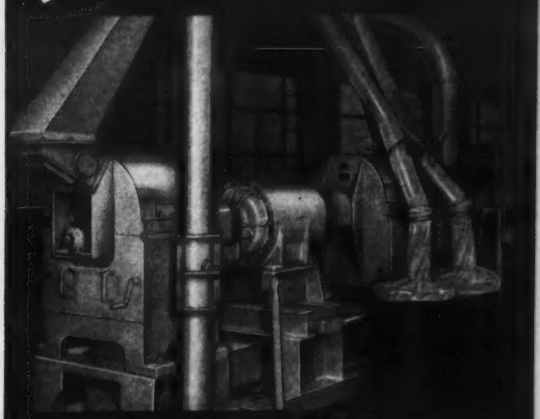
Check 2021 opposite last page.

Pneumatic-conveying pump needs 17" clearance to mount beneath tracks. It unloads at rates to 300 bbl/hr at conveying distances to 125'. It is subject of Kompact Pump Information — Fuller Company, Subsidiary of General American Transportation Corp.

Check 2022 opposite last page.

PRATER MILLS

IN THE PROCESS INDUSTRIES



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Check 2024 opposite last page.

Vibrating feeders, at Supplex Company, Div. of Amerace Corporation, resulted in two men replacing five, doubling of capacity, and reduction of maintenance to quarterly lubrication. Over-all cost reduction was 60%. Full story of this installation is contained in Bul CP-60 — Vibra Screw Feeders, Inc.

Check 2025 opposite last page.

Bulk-handling system, which is based on metal containers and filling and discharging equipment, is reviewed in 32-page Tote Report — Tote System, Division of The Hoover Ball and Bearing Company.

Check 2026 opposite last page.

Drum handlers which can accommodate both fiber and steel drums are reviewed in Brochure 9121 — Little Giant Products, Inc.

Check 2027 opposite last page.

Bulk-handling railroad car is built with three separate compartments . . . each with its own nozzles and hatches. Further explanation is contained in Dry-Flo Chem Car Details — Airslide and Dry-Flo Car Division, General American Transportation Corporation.

Check 2028 opposite last page.

Plant Engineering

Heat-exchanger-tube-maintenance tools include automatic expansion controls, condenser cleaners, and internal cutters. Airetool Manufacturing Company.

Check 2029 opposite last page.

Torque-wrench formulas, applications, adapter problems and general principles are all covered in "Torque Manual"—P. A. Sturtevant Co.

Check 2030 opposite last page.

Fused-quartz physical properties and transmission characteristics are taken up in 40-page Fused Quartz Brochure — Dept. CP-111, Willoughby Quartz Plant, General Electric Company.

Check 2031 opposite last page.

Motor-control centers are made with all outer surfaces and structural parts in 12-gage steel. Full story is contained in Bul SM-244 — Square D Company.

Check 2032 opposite last page.

Belt-driven axial fans are available in sizes through 60". They have universal mounting plates which accommodate motors to 30 hp. Further details are tabulated in Bul 625CP — Propellair, Division of Robbins & Myers, Inc.

Check 2033 opposite last page.

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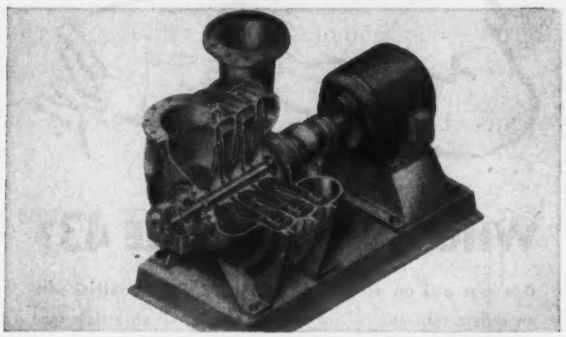
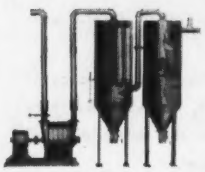


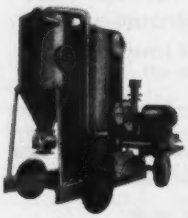
MULTISTAGE CENTRIFUGAL BLOWERS & EXHAUSTERS

Rugged cast iron Hoffman blowers deliver clean dry air or gas in continuous duty applications such as combustion, agitation, drying, vacuum cleaning, sewage and waste treatment, pneumatic conveying, air squeegee, ore flotation, circulation of liquids, asphalt blowing, etc. Pressures to 10 psig, vacuums to 12" hg, and volumes to 20,000 cfm. Outboard mounted bearings. One piece cast aluminum impellers. Dynamically balanced rotors. No internal wearing parts. Vibration free operation. Constant pressure or vacuum throughout capacity range. Suitable for direct drive by motor, turbine or engine. Common steel baseplate.



STATIONARY VACUUM CLEANING SYSTEMS

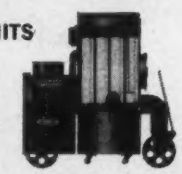
Permanently installed stationary vacuum systems ranging from 3 hp to 100 hp permit cleaning operations throughout the plant with collection at a central location. These systems will help prevent product contamination, insure better housekeeping, salvage valuable materials, eliminate manual handling and disposal. Heavy duty dust separators receive material and large filter cloth areas insure thorough separation. Suction hoses are inserted into strategically located inlet valves in piping system.



PNEUMATIC CONVEYING EQUIPMENT

Hoffco-Veyor pneumatic systems keep dry, powdery and granular materials on the flow. Permanent installations transfer a variety of materials including chemical powders, starch, plastic pellets, pharmaceuticals, etc., from one point to another in the production process. Rugged portable Hoffco-Veyors such as this trailer mounted unit, can be used to handle catalyst, clay, sand, etc., in refineries, brick plants and chemical installations.

PORTABLE VACUUM CLEANING UNITS



Maximum efficiency in industrial housekeeping can be achieved with Hoffman heavy duty portable vacuum cleaners which range from 1½ hp through 15 hp. Mobility and flexibility enables the operator to do an efficient and thorough job of vacuum cleaning anywhere in the plant. Typical of the Hoffman portable units is the 7½ hp Hoffco-Vac 75 developing 7.8" hg suction and capable of operating two hose lines simultaneously. Filtering area 48 sq. ft. Removable dust bucket with capacity of 7.5 cu. ft.

MATERIAL INTAKE VALVE

Unique feeding valves permit the introduction of dry free flowing materials into vacuum conveying systems. Design incorporates offset air and material entry ports making it possible to regulate material flow and yet allow air to enter the line for purging. Separate air inlet protects connected equipment from full suction of the system. Constructed of cast iron, stainless steel or bronze. Valves can be modified for air cylinder operation.

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Rubber diaphragm valve utilizes peristaltic action to discharge materials in controlled quantities. Designed to handle the type of product which can not be successfully passed through a rotary feeder, Alternate opening and closing of sheet rubber diaphragms facilitate passage of coarse abrasives or odd shaped materials. Elliptical body section and sandwiching of diaphragms insures positive closure against high differential pressures. Fail-safe feature provided in event of rupture of either diaphragm.

ROTARY DISCHARGE VALVE

These chain-driven air-locks of cast semi-steel construction discharge materials from pneumatic systems. Valves have torque limiting drive sprockets to protect against jamming and overloading. Equalizing connections permit attachment of bleed lines to vacuum or pressure source. Inspection of interior can be made through access port without disassembling valve. Fabricated and cast multi-bladed rotors are designed for interchangeability. Standard horizontal shaft gear motors.

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CURRENT LITERATURE

Wire cloth is available in unusual metals or alloys, such as titanium. Subject is taken up in 120-page Wire Cloth Cat — Dept. F, The Cambridge Wire Cloth Co.

Check 2037 opposite last page.

TFE-fluorocarbon-resin-coated glass fabrics and laminates are specified and applications discussed in four-page Armalon Bul — Fabrics Sales, E. I. du Pont de Nemours & Co. (Inc.)

Check 2038 opposite last page.

"The Dry-Piston Compressor for Handling Gases and Vapours without Oil Contamination," is the title of a 14-page article which has been reprinted. It is available from Sulzer Bros. Inc.

Check 2039 opposite last page.

Cleaning-chemicals program is subject of bulletin giving specific details and outlining procedures. Bul F-10822 — Oakite Products, Inc.

Check 2040 opposite last page.

Rotary positive blowers are available in 30 production models in capacities of 30 to 4000 cfm, for pressures to 15-psig (single) or 70 psig (multi-stage). They are considered in Rotary Blowers Information — M-D Blowers, Inc., Subsidiary of Miehle-Goss-Dexter, Inc.

Check 2041 opposite last page.

Insulation line includes types for temperatures in range of −200 to +1900°F. Explanatory data may be obtained from Insulation Division, Mundet Cork Corporation.

Check 2042 opposite last page.

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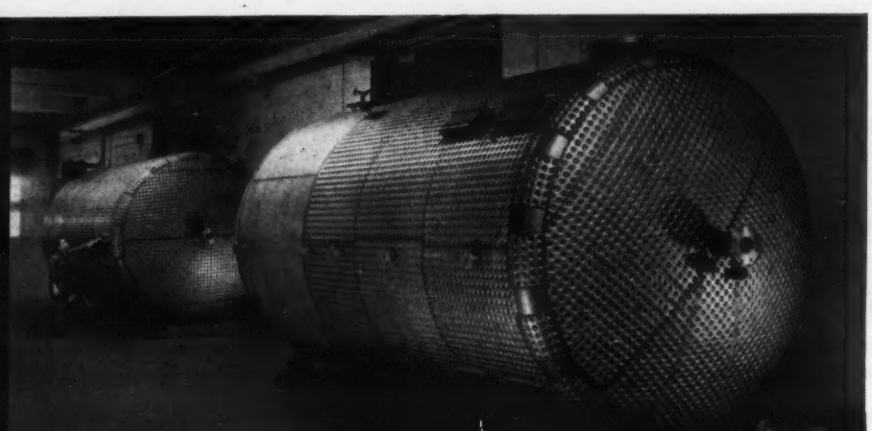

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Check 2036 opposite last page.

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Almost everyone knows of some tricky unexpected danger situation in his plant. CHEMICAL PROCESSING feels that the dissemination of such information to readers is important. Therefore a monthly series on Chemical Boobytraps is now appearing in the Engineering and Safety section. (See page 195.) If you know of any such situation, please forward an account of it to:

Safety Editor
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

Roof ventilators need no throttling weather covers. They are available with ratings to 78,000 cfm. For details, see Bul 680-CP — Propellair, Division of Robbins & Myers, Inc.

Check 2043 opposite last page.

Enclosed starters for hazardous locations may be obtained completely wired and mounted on racks built to specifications. These are explained in Spin Top Details — Square D Company.

Check 2044 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page.

Force-feed lubricators deliver changing amount of oil with changing engine speeds. They are covered in Lubricators Cat—Manzel, Unit of Houdaille Industries, Inc.

Check 2045 opposite last page.

Refuse storage and hauling system, which is handled by private contractors, is discussed in Dumpmaster Brochure—Dept. CP-10, Dempster Brothers Inc.

Check 2046 opposite last page.

Motor couplings incorporate Allen-head spiral-cam fasteners which open and close with one-quarter turn. Their story is told in Folder 2975 — Link-Belt Company.

Check 2047 opposite last page.

Ventilator-blowers are portable and may be adapted to supply fresh air or discharge foul air or fumes. They are topi- of facts available from Coppus Engineering Corp.

Check 2048 opposite last page.

Wire cloth and screens are woven from stainless steel, Monel, bronze, copper, brass, high-carbon and oil-tempered steel, and virtually any metal which can be drawn into wire. Ludlow-Saylor Wire Cloth Company.

Check 2049 opposite last page.

Also, Star Wire Screen and Iron Works, Inc., Subsidiary of Ludlow-Saylor Wire Cloth Co.

Check 2050 opposite last page.

Dihedral drive couplings which can handle angular and offset misalignment totaling 7° are considered in Dihedral Couplings Cat — Ajax Flexible Couplings Co. Inc.

Check 2051 opposite last page.

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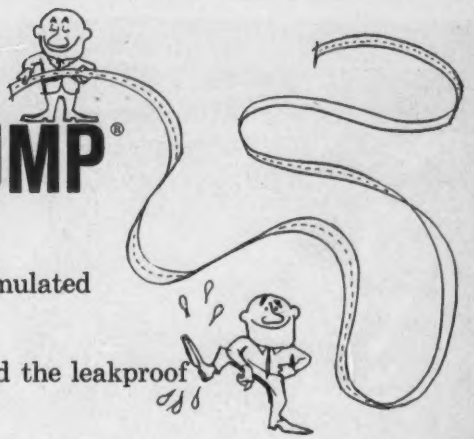

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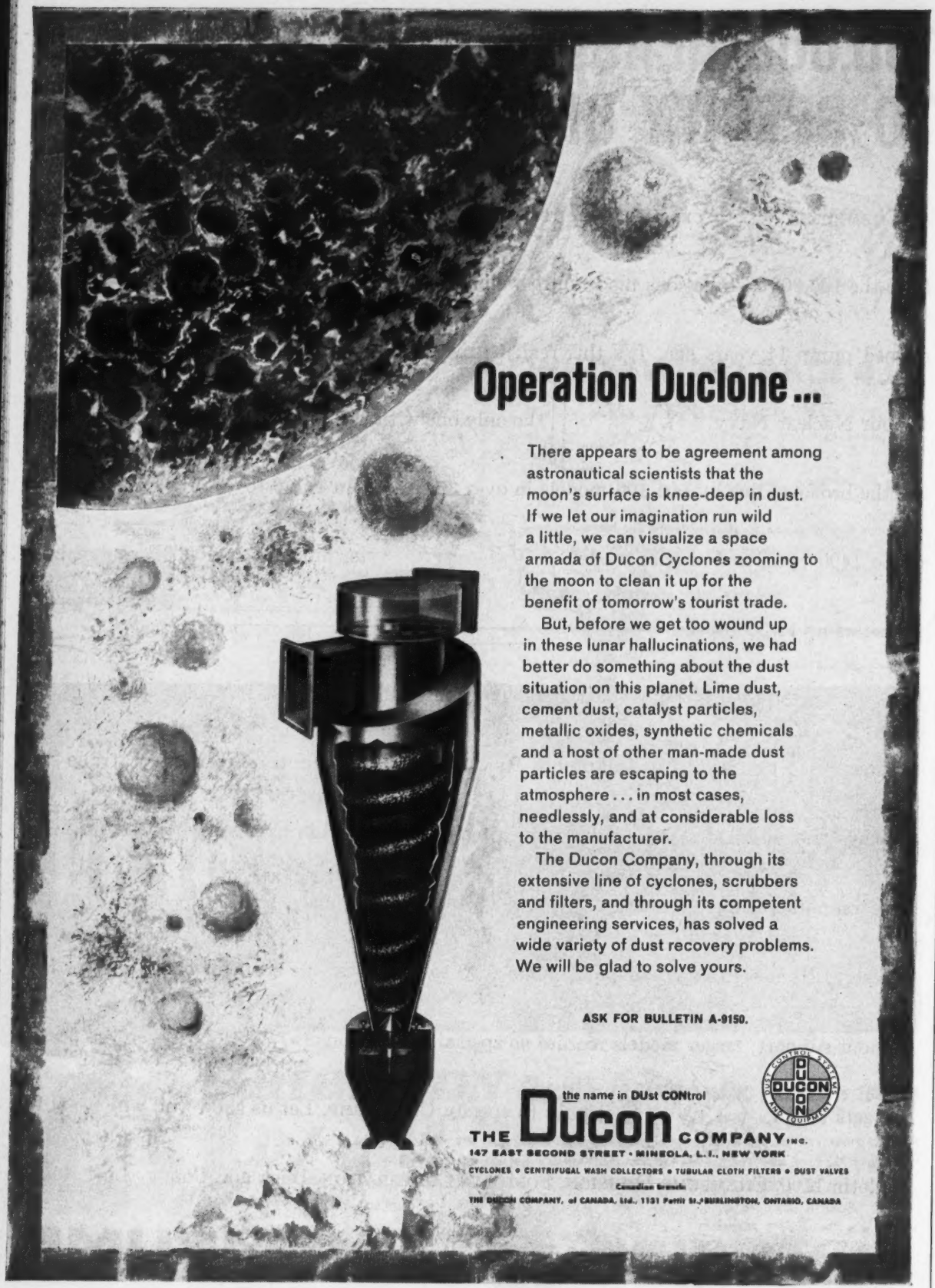
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Check 2054 opposite last page.

V-belt drives are topic of 40-page bulletin, including drive-selection tables, hp tables, nomographs for selecting service levels and calculation steps for figuring proper tensions. Bul A695A — Dodge Manufacturing Corporation.

Check 2055 opposite last page.

Temperature-control applications are taken up in Bul IV 1014 — Spence Engineering Company, Incorporated.

Check 2056 opposite last page.

Ringless piston compressors are non-lubricated and available for capacities of 10 to 4000 cfm and discharge pressures to 650 psig. Axial units may be obtained for suction volumes of 20,000 to 300,000 cfm and pressure ratios to five in single casing. Sulzer Bros. Inc.

Check 2057 opposite last page.

Mixing and Blending

Kettles of both conventional and steam-jacketed types with or without agitators are illustrated in Kettles Cat—Hamilton, Division of Brighton Corp.

Check 2058 opposite last page.

CURRENT LITERATURE

Sanitary-mixers details are presented in catalog published by S. Howes Company, Inc.

Check 2059 opposite last page.

Continuous automatic mixers are used in production of paper coatings, photographic emulsions, polyvinyl acetate, polyvinyl alcohol, polyester adhesive, plastisol and latex foams, among others. Details may be obtained from The E. T. Oakes Corporation.

Check 2060 opposite last page.

Mass, paste and ribbon mixers are subjects of Mass & Paste and Ribbon Mixers Cats — Paul O. Abbe Inc.

Check 2061 opposite last page.

Pipeline homogenizers each incorporate high-speed turbine-rotor which draws product in, shears it in fine clearances between rotor and stator, and forces it through restrictive openings in stator. Dept CP10, Eppenbach Division, Gifford-Wood Co.

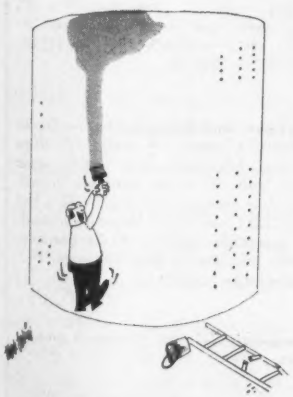
Check 2062 opposite last page.

Dispersators incorporate mixing heads which have double-shearing action resulting in complete wetting and breakdown of particle size. The Premier Mill Corporation.

Check 2063 opposite last page.

Mixers—and how to change their gears in minutes for speeds from 20 to 280 rpm—are subject of 64-page Cat A-19—Philadelphia Mixer, Division of Philadelphia Gear Corporation.

Check 2064 opposite last page.



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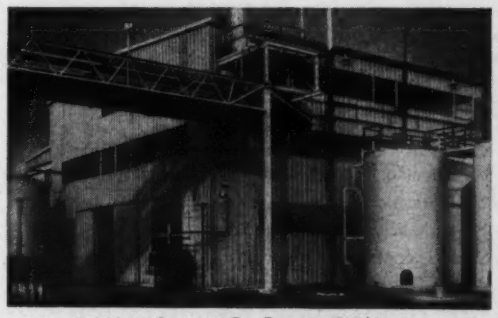
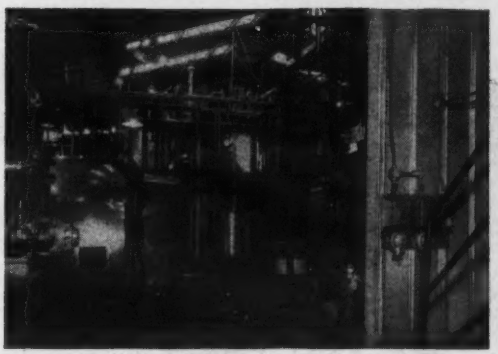


Reichhold Chemical Co., Tacoma, Washington



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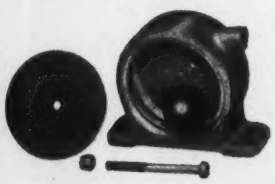

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ADVERTISERS in this Issue

A

Abbé Engineering Co. 74
Paul O. Abbé Inc. 143
ACF Industries, W-K-M Division 173
Airetool Manufacturing Company 194
Airmatic Valve, Inc. 49
Airslide and Dry-Flo Car Division, General American Transportation Corporation 105
Allen-Bradley Co. 54A-B
Allied Chemical Corp., Baker & Adamson General Chemical Division 2nd Cover
Allied Chemical Corp., General Chemical Division 41
Allis-Chalmers 20-21, 94, 95, 96, 97
Alloy Products Corp. 8
Alloy Steel Products Company, Subsidiary of Walworth 192
Alpha-Molykote Corporation, The 210
Alsop Engineering Corporation 134
American Chain & Cable Company, Inc. Helicoid Gage Division 44
American Chain & Cable Company, Inc., R-P&C Valve Division 202
American Meter Company, Pump Division 18
American Oil Company 45
Angola Alloy Fabricators 84
Annin Company, The 93
Appleton Electric Company 206
Armstrong Machine Works 211

B

Baker & Adamson, General Chemicals Division, Allied Chemical Corporation ..... 2nd Cover
Barnes & Jones, Inc. 112
Barnstead Still and Sterilizer Co. 55
Bartlett-Snow-Pacific, Inc. 163
Bauer Bros. Co., The 128
Bean, John, Division of Food Machinery & Chemical Corp. 220
Bel-Art Products 52
Bemis Bro. Bag Co. 115
B-I-F Industries, A Division of The New York Air Brake Company 124
Binks Manufacturing Company 208
Blaw-Knox Company, Chemical Plants Division 56-57
Brighton Corporation 220
Bristol Company, The 172
Bucket Elevator Co., The 156
Buell Engineering Co., Inc. 98, 99
Buffalo Forge Company, Air Handling Division 10
Butler Manufacturing Company 223

C

Cambridge Instrument Company, Inc. 52
Cambridge Wire Cloth Co., The 152
Cameron Iron Works, Inc. 158
Celanese Chemical Company 42A-B
Centrico Incorporated 139
Chemical & Power Products, Inc. 60
Chemical Industries Exposition 36
Chempump Division, Fostoria Corporation 221
Chicago Pneumatic 168-169
Chiksan Company 147
Ciech Ltd. 49
Clayton Mark & Company 215
Cleveland Vibrator Company, The 182
Colonial Plastics Mfg. Co., Subsidiary of the Van Dorn Iron Works Co. 71
Combustion Engineering, Inc., Raymond Division 148
Continental Manufacturing Co. 123
Conveyors and Dumpers Incorporated, Division of Mercury Industries, Inc. 46
Conveyor Systems, Inc., A. B. Farquhar Division 190
Coppus Engineering Corp. 226
Corning Glass Works 142
Crane Co., Industrial Products Group 7
Crane Packing Company 6
Crawford Fitting Company 207
Croll-Reynolds Co., Inc. 204
Curtiss-Wright Corporation, Marquette Division 200

D

Darling Valve & Manufacturing Co. 218
Davenport Machine & Foundry Company, A Division of Middle States Corporation 149
Dawes Laboratories, Inc. 54
Delavan Manufacturing Company 175, 214
Derrick Manufacturing Co. 114
Dodge Manufacturing Corporation 198
Dow Chemical Company, The 17
Dow Corning Corporation 66
Ducon Company, Inc., The 222
Duriron Company, Inc., The 203
Dustex Corp. 136

E

Eastern Industries, Inc., Mixer Division 91
Eastern Industries, Inc., Pump Division 90
Eco Engineering Company 85-86
Elgin Softener Corporation 166
Eriez Manufacturing Co. 51
Esco 190A-B
Exact Weight Scale Co., The 182

F

Falcon Manufacturing The, Div. of The First Machinery Corp. 110
Falk Corporation, The 11
Flo-Tronics, Inc. Air Conveyor Division 212
Fuller Company, Subsidiary of General American Transportation Corporation 113

G

Galigher Co., The, Metallurgical Division 154
General American Transportation Corporation, Airslide and Dry-Flo Car Division 105
General American Transportation Corporation, Process Equipment Division 107
General American Transportation Corporation, Process Equipment Division, Turbo-Mixers 109
General Chemical Division, Allied Chemical Corporation 41
General Electric, Willoughby Quartz Plant 193
Gifford-Wood Company, Eppenbach Division 216
Girdler Corporation 9
Girdler Process Equipment Division, Chemetron Corporation 23
Glas-Col Apparatus Company 160-161
Goslin-Birmingham Manufacturing Co., Inc. 162

H

Hamilton Institute, Alexander 15
Harbison-Walker Refractories Company 131
Helicoid Gage Division, American Chain & Cable Company, Inc. 44
Hetherington & Berner Inc. 176
Highside Chemicals, Incorporated 54
Hills-McCanna Company 79-80
Hoffman Industries, Inc., A Subsidiary of Hoffman International, Air Appliance Division 219
Hooker Chemical Corporation 47
Hough Co., The Frank G. 183
Howard Terminal Co. 184
Howes Company, Inc., S. 100

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I

Illinois Water Treatment Co. 53
Industrial Filter & Pump Mfg. Co. .. 199
International Nickel Company, Inc., The 69

J

Jamesbury Corp. 141
Jenkins Bros. 5
Johns-Manville 67
Johnson Corporation, The 226
Jomac Inc. 194
Joy Manufacturing Company 10

K

Kellogg Company, The M. W., A Subsidiary of Pullman Incorporated 3
Kieley & Mueller, Incorporated 188
Knox Porselain Corporation 212
Kuhns Brothers Co., The 177
Kunkle Valve Co., Inc. 214

L

LaBour Company, Inc., The 197
Lammert & Mann Co., Inc. 70
Lapp Insulator Co., Inc., Process Equipment Division 137
Lee Metal Products Company, Inc. 127
Lehman Company, Inc., J. M. 72
Liquid Carbonic Division of General Dynamics 103
Ludlow-Saylor Wire Cloth Company 184

M

Madden Corporation, The 156
Majac, Inc. 144
Manzel, A Unit of Houdaille Industries, Inc. 201
Marsh Instrument Company, Division of Colorado Oil and Gas Corporation 177
Mechanical Products Corporation 218
M-H Standard Corporation 70
Mission Valve and Pump Co., A Subsidiary of Mission Manufacturing Co. 129
Molded Fiber Glass Tray Co. 190
Monsanto Chemical Company, Organic Chemicals Division 8
Morehouse-Cowles, Inc. 88
Multi-Metal Wire Cloth Co., Inc. 108

N

National Drying Machinery Co., The .. 157
National Engineering Company, Simpson Mix-Muller Division 12-13
National Filter Media Corporation, The 74
National Starch and Chemical Corporation 22
Neptune Meter Company, Liquid Meter Division 174
Niagara Blower Company 176
Norcross Corporation 146
Nordstrom Valve Division, Rockwell Manufacturing Company 14A-B

O

Oakite Products, Inc. 73

P

Parker-Hannifin, Parker Fittings and Hose Division 209
Parks-Cramer Co. 140
Partlow Corp., The 43
Patterson Foundry & Machine Company 166A-B
Pennsylvania Fluorocarbon Co., Inc. 176
Pfaudler Division, Pfaudler Permutit Inc. 132-133
Philadelphia Mixer, Division of Philadelphia Gear Corporation 159
Pittsburgh Chemical Co., Activated Carbon Division 26
Platecoil Division, Tranter Manufacturing, Inc. 146
Potts Company, Horace T., Speedline Fittings Division 61
Powell Company Wm., The 24-25
Powell Pressed Steel Company, The 217
Prater Pulverizer Company 218
Premier Mill Corp. 126
Propellair, Div. of Robbins & Myers, Inc. 210
Protective Lining Corporation 66A-B
Protectoseal Company, The 104
Putman Publishing Company 64, 65

R

Rapids Machinery Company 140
Raybestos-Manhattan, Inc., Manhattan Rubber Division 63
Raybestos-Manhattan, Inc., Plastic Products Division 46
Raymond Bag Corporation, A Division of Albermarle Paper Mfg. Co. 185

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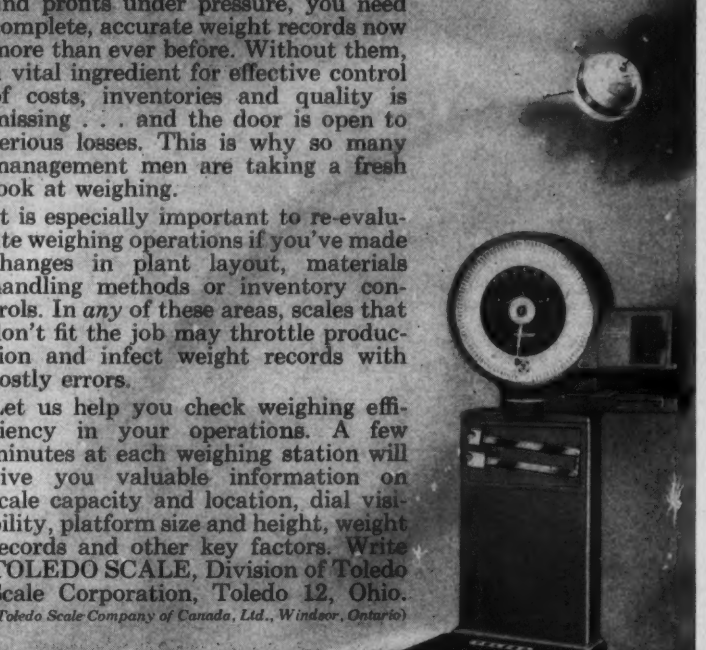

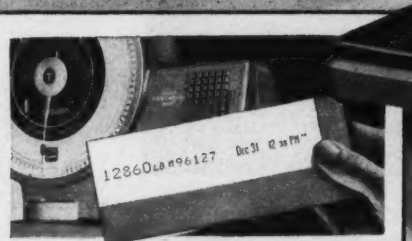

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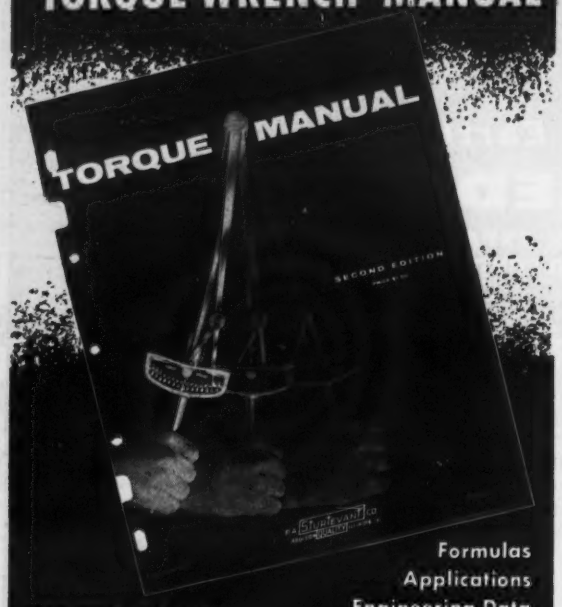

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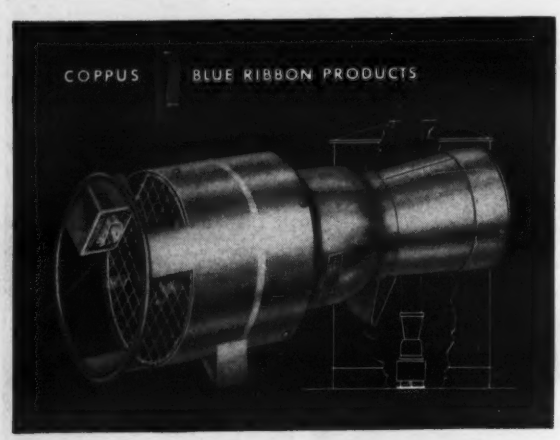

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Check 2069 opposite last page.

Raymond Division, Combustion Engr., Inc. 148
Richardson Scale Company 81
Robbins & Myers, Inc. 189
Robertshaw-Fulton Controls Company, Fulton Sylphon Division 29
Rockwell Company, W. S. 195
Rockwell Manufacturing Company, Nordstrom Valve Division 14A-B
Rockwell-Standard Corporation, Grating Division 52
Rohm & Haas 42
Ross & Son Co. Inc., Charles 60
R-P&C Valve Division, American Chain & Cable 202

S

Sandvik Steel, Inc., Steel Belt Conveyor Department 165
Saran Lined Pipe Company 17
Sarco Company Inc. 213
Sargent's Sons Corporation, C. G. 130
Scott Aviation Corporation 66
Selas Flotronics, A Division of Selas Corporation of America 138
Shriver & Company Inc. T. 150
Sigmamotor, Inc. 156
Simon-Carter Co. 214
Simpson Mix-Muller Division, National Engineering Company 12-13
Simpson Company Orville, The 68
Sly Manufacturing Co., The W.W. 196
Snap-Tite 38
Southwestern Engineering Co. 135
Speedline Fittings Division, Horace T. Potts Company 61
Spence Engineering Company, Inc. 167
Spraying Systems Co. 226
Sprout, Waldron & Co., Inc. 166
Square D Company 80
Steinen Mfg. Co., Wm., Industrial Nozzle Division 114
Stephens-Adamson Mfg. Co., Products Division 190
Strahman Valves Inc. 149
Sturtevant Co., P.A. 226
Sturtevant Mill Co. 164
Sulzer Bros. Inc. 87
Sun Shipbuilding & Dry Dock Company 50
Swenson Evaporator Company Division, Whiting Corporation 195

T

Taylor Instrument Companies 178-179
Taylor, Stiles & Company 92
Thermo Electric Co., Inc. 170
Toledo Scale, Division of Toledo Scale Corporation 225
Toteline 190
Tranter Manufacturing, Inc., Platecoil Division 146
Travlor Engineering & Manufacturing, Division of Fuller Company 111
Trent Inc. 218
Turbo-Mixers, General American Transportation Corporation, Process Equipment Division 109
Tyler Company W.S., The 205

U

U. S. Electrical Motors Inc. ..... 4th Cover
U. S. Stoneware, Process Equipment Division 14
United States Rubber, Transportation Products Dept. 186, 187
Universal Road Machinery Co. 72

V

Valcor Engineering Corp. 156
Vanadium Corporation of America 52
Vanton Pump and Equipment Corp., Division of Cooper Alloy Corporation 54, 70, 210
Vapor Corporation 151, 153, 155
Viber Company 224
Victaulic Company of America 101
Viking Pump Company 110
Virginia Gear & Machine Corp. 159
Vogt Machine Co., Henry 145

W

Wallace & Tiernan Inc. 16
Walworth Co. 82-83
West Instrument Corporation 171
Western Precipitation, Division of Joy Manufacturing Company 89
Wheelabrator Corporation 125
Whitey Research Tool Co. ..... 3rd Cover
Whiting Corporation, Swenson Evaporator Company Division 195
Wiegand Company, Edwin L. 122
W-K-M Division, ACF Industries 173
Wolverine Equipment Company 164
Wolverine Tube Division of Calumet & Hecla Inc. 18A-B
Worcester Valve Co., Inc. 19

Y

Yarnall-Waring Company 106

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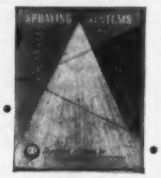

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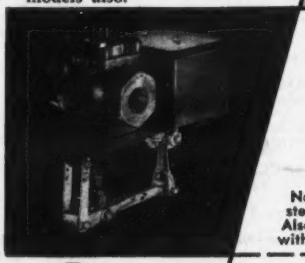

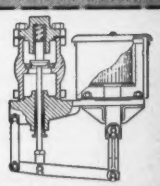

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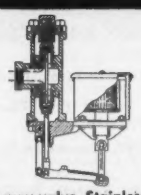
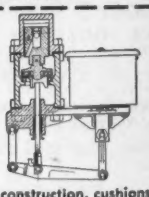


3-way valve. Stainless steel valves and seats. Sizes ½"-1½".



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☐ 1822	☐ 1864	☐ 1906	☐ 1948
☐ 1823	☐ 1865	☐ 1907	☐ 1949
☐ 1824	☐ 1866	☐ 1908	☐ 1950
☐ 1825	☐ 1867	☐ 1909*	☐ 1951
☐ 1826	☐ 1868	☐ 1910	☐ 1952
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☐ 1831	☐ 1873	☐ 1915	☐ 1957
☐ 1832	☐ 1874	☐ 1916	☐ 1958
☐ 1833	☐ 1875	☐ 1917	☐ 1959

☐ 1960*	☐ 1989	☐ 2018*	☐ 2047
☐ 1961	☐ 1990	☐ 2019	☐ 2048
☐ 1962	☐ 1991	☐ 2020	☐ 2049
☐ 1963*	☐ 1992	☐ 2021	☐ 2050
☐ 1964	☐ 1993	☐ 2022	☐ 2051
☐ 1965	☐ 1994	☐ 2023	☐ 2052
☐ 1966	☐ 1995	☐ 2024	☐ 2053
☐ 1967	☐ 1996	☐ 2025	☐ 2054
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☐ 1970	☐ 1999	☐ 2028	☐ 2057
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☐ 1972	☐ 2001	☐ 2030	☐ 2059
☐ 1973	☐ 2002	☐ 2031	☐ 2060
☐ 1974	☐ 2003	☐ 2032	☐ 2061*
☐ 1975	☐ 2004	☐ 2033	☐ 2062
☐ 1976	☐ 2005	☐ 2034*	☐ 2063
☐ 1977	☐ 2006	☐ 2035*	☐ 2064
☐ 1978	☐ 2007	☐ 2036*	☐ 2065
☐ 1979	☐ 2008	☐ 2037	☐ 2066
☐ 1980	☐ 2009	☐ 2038	☐ 2067*
☐ 1981	☐ 2010	☐ 2039	☐ 2068
☐ 1982	☐ 2011	☐ 2040	☐ 2069
☐ 1983	☐ 2012	☐ 2041	☐ 2070*
☐ 1984*	☐ 2013	☐ 2042	☐ 2071
☐ 1985	☐ 2014	☐ 2043	☐ 2072
☐ 1986	☐ 2015	☐ 2044	☐ 2073
☐ 1987	☐ 2016	☐ 2045	☐ 2074
☐ 1988	☐ 2017	☐ 2046	

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Key No.	Description

☐ 1520*	☐ 1554	☐ 1588*	☐ 1622	☐ 1656	☐ 1690	☐ 1724	☐ 1758
☐ 1521	☐ 1555	☐ 1589	☐ 1623	☐ 1657	☐ 1691*	☐ 1725	☐ 1759
☐ 1522	☐ 1556	☐ 1590	☐ 1624	☐ 1658	☐ 1692	☐ 1726	☐ 1760
☐ 1523	☐ 1557	☐ 1591	☐ 1625*	☐ 1659	☐ 1693	☐ 1727	☐ 1761
☐ 1524*	☐ 1558	☐ 1592*	☐ 1626	☐ 1660	☐ 1694	☐ 1728	☐ 1762
☐ 1525	☐ 1559	☐ 1593	☐ 1627	☐ 1661	☐ 1695	☐ 1729	☐ 1763
☐ 1526	☐ 1560	☐ 1594	☐ 1628	☐ 1662	☐ 1696	☐ 1730	☐ 1764*
☐ 1527	☐ 1561	☐ 1595	☐ 1629	☐ 1663	☐ 1697	☐ 1731	☐ 1765
☐ 1528	☐ 1562	☐ 1596	☐ 1630*	☐ 1664	☐ 1698	☐ 1732	☐ 1766
☐ 1529*	☐ 1563	☐ 1597	☐ 1631	☐ 1665	☐ 1699	☐ 1733*	☐ 1767
☐ 1530*	☐ 1564	☐ 1598	☐ 1632*	☐ 1666	☐ 1700	☐ 1734	☐ 1768
☐ 1531	☐ 1565	☐ 1599	☐ 1633*	☐ 1667	☐ 1701	☐ 1735	☐ 1769
☐ 1532	☐ 1566	☐ 1600	☐ 1634	☐ 1668	☐ 1702	☐ 1736*	☐ 1770
☐ 1533	☐ 1567	☐ 1601	☐ 1635*	☐ 1669	☐ 1703	☐ 1737	☐ 1771
☐ 1534	☐ 1568	☐ 1602*	☐ 1636	☐ 1670	☐ 1704	☐ 1738	☐ 1772
☐ 1535	☐ 1569*	☐ 1603	☐ 1637*	☐ 1671	☐ 1705	☐ 1739	☐ 1773*
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☐ 1537	☐ 1571	☐ 1605	☐ 1639	☐ 1673	☐ 1707	☐ 1741	☐ 1775
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☐ 1539	☐ 1573	☐ 1607*	☐ 1641	☐ 1675	☐ 1709	☐ 1743	☐ 1777
☐ 1540	☐ 1574*	☐ 1608	☐ 1642	☐ 1676	☐ 1710	☐ 1744	☐ 1778
☐ 1541*	☐ 1575	☐ 1609	☐ 1643	☐ 1677	☐ 1711	☐ 1745	☐ 1779
☐ 1542	☐ 1576*	☐ 1610	☐ 1644	☐ 1678	☐ 1712	☐ 1746	☐ 1780
☐ 1543*	☐ 1577	☐ 1611	☐ 1645	☐ 1679	☐ 1713	☐ 1747	☐ 1781
☐ 1544	☐ 1578*	☐ 1612	☐ 1646	☐ 1680	☐ 1714	☐ 1748	☐ 1782
☐ 1545	☐ 1579	☐ 1613	☐ 1647	☐ 1681	☐ 1715	☐ 1749	☐ 1783
☐ 1546	☐ 1580	☐ 1614	☐ 1648	☐ 1682	☐ 1716	☐ 1750	☐ 1784
☐ 1547	☐ 1581	☐ 1615	☐ 1649*	☐ 1683	☐ 1717	☐ 1751	☐ 1785
☐ 1548	☐ 1582	☐ 1616	☐ 1650	☐ 1684	☐ 1718	☐ 1752	☐ 1786
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☐ 1550	☐ 1584*	☐ 1618	☐ 1652	☐ 1686	☐ 1720	☐ 1754	☐ 1788
☐ 1551	☐ 1585	☐ 1619	☐ 1653	☐ 1687	☐ 1721*	☐ 1755	☐ 1789
☐ 1552	☐ 1586	☐ 1620	☐ 1654	☐ 1688	☐ 1722	☐ 1756	☐ 1790
☐ 1553	☐ 1587	☐ 1621	☐ 1655	☐ 1689	☐ 1723	☐ 1757	☐ 1791

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(This request form expires February 5, 1962)

☐ 1792	☐ 1834	☐ 1876	☐ 1918
☐ 1793*	☐ 1835	☐ 1877	☐ 1919
☐ 1794	☐ 1836	☐ 1878	☐ 1920*
☐ 1795	☐ 1837	☐ 1879*	☐ 1921
☐ 1796	☐ 1838	☐ 1880	☐ 1922
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☐ 1831	☐ 1873	☐ 1915	☐ 1957
☐ 1832	☐ 1874	☐ 1916	☐ 1958
☐ 1833	☐ 1875	☐ 1917	☐ 1959

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Key No.	Description

☐ 1960*	☐ 1989	☐ 2018*	☐ 2047
☐ 1961	☐ 1990	☐ 2019	☐ 2048
☐ 1962	☐ 1991	☐ 2020	☐ 2049
☐ 1963*	☐ 1992	☐ 2021	☐ 2050
☐ 1964	☐ 1993	☐ 2022	☐ 2051
☐ 1965	☐ 1994	☐ 2023	☐ 2052
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☐ 1967	☐ 1996	☐ 2025	☐ 2054
☐ 1968	☐ 1997	☐ 2026	☐ 2055
☐ 1969	☐ 1998	☐ 2027	☐ 2056
☐ 1970	☐ 1999	☐ 2028	☐ 2057
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☐ 1972	☐ 2001	☐ 2030	☐ 2059
☐ 1973	☐ 2002	☐ 2031	☐ 2060
☐ 1974	☐ 2003	☐ 2032	☐ 2061*
☐ 1975	☐ 2004	☐ 2033	☐ 2062
☐ 1976	☐ 2005	☐ 2034*	☐ 2063
☐ 1977	☐ 2006	☐ 2035*	☐ 2064
☐ 1978	☐ 2007	☐ 2036*	☐ 2065
☐ 1979	☐ 2008	☐ 2037	☐ 2066
☐ 1980	☐ 2009	☐ 2038	☐ 2067*
☐ 1981	☐ 2010	☐ 2039	☐ 2068
☐ 1982	☐ 2011	☐ 2040	☐ 2069
☐ 1983	☐ 2012	☐ 2041	☐ 2070*
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☐ 1985	☐ 2014	☐ 2043	☐ 2072
☐ 1986	☐ 2015	☐ 2044	☐ 2073
☐ 1987	☐ 2016	☐ 2045	☐ 2074
☐ 1988	☐ 2017	☐ 2046	

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THAT'S INTERESTING

Vinyl versus carbon black

Tires with low rolling resistance and less power loss can be made by using a vinylic filler in place of carbon black, so reports the Army.

In the test an acidic vinylic filler was used with styrene-butadiene-rubber stocks in a 50/50 mixture.

Operating temp was not lowered, however, and abrasion loss was higher.

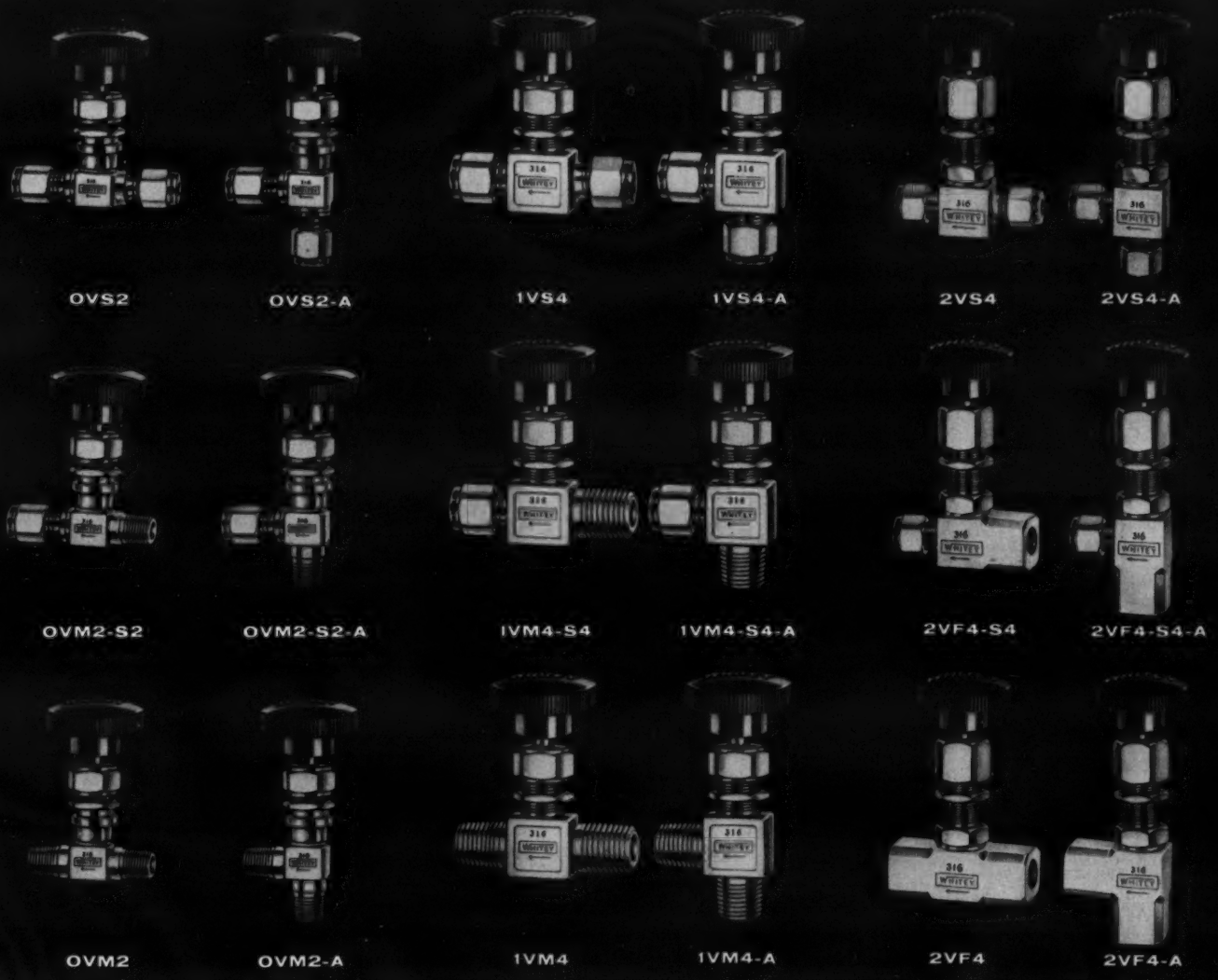
Turnover good?

Companies which push for ever lower turnover figures may be asking for stagnation, the Association of Casualty & Surety Companies of New York reports.

Low turnover can mean trouble when it is caused over-aged, more stable staffs, incompetent employes or supervisors' hesitancy to fire.

For more information on product at right, specify 2072 see information request blank opposite last page.

WHITEY MINIATURE VALVES



WHITEY Research Tool Co. manufactures a complete stock of small valves designed for instrumentation work or any application demanding flawless performance in fluid or pneumatic systems.

The WHITEY Valves above illustrate some of the wide variety of connections available in ⅛" and ¼" pipe and tube sizes. These valves are stocked locally by your WHITEY Distributor.

In answer to customer demand, all WHITEY Valves through ½" size are available with Swagelok Tube Fitting Connections to facilitate ease of installation and positive, leakproof performance. Male and female pipe connections through ½" size are also available.

Panel mounting; Teflon* cylinder packing; micro-regulating and non-regulating stems are standard features on all WHITEY Valves.

For color coding purposes, colored handles may be specified when ordering WHITEY Valves.

*Dupont

Complete technical data on WHITEY Valves available on request

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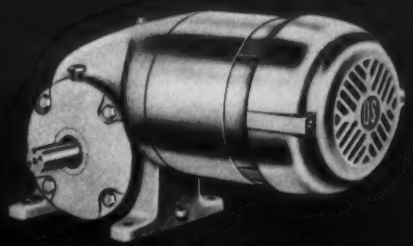
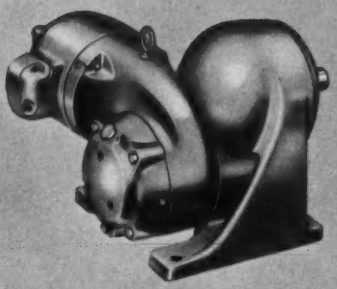
COMPACT, LOW-SPEED POWER...

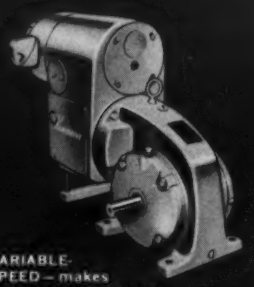


TOTALLY ENCLOSED—for corrosive dust, salt spray and other damaging environments—provides slow speeds for applications in which ordinary motors require frequent replacement.

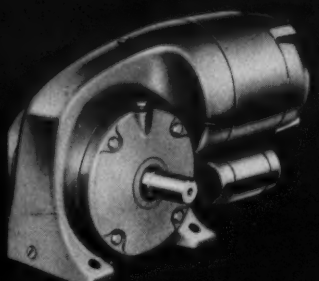
EXPLOSION-PROOF—for volatile fume, explosive dust atmospheres—provides genuine explosion-proof characteristics for hazardous environments. Underwriters' Laboratories approved for Class 1 Group D and Class 2 Groups F and G.



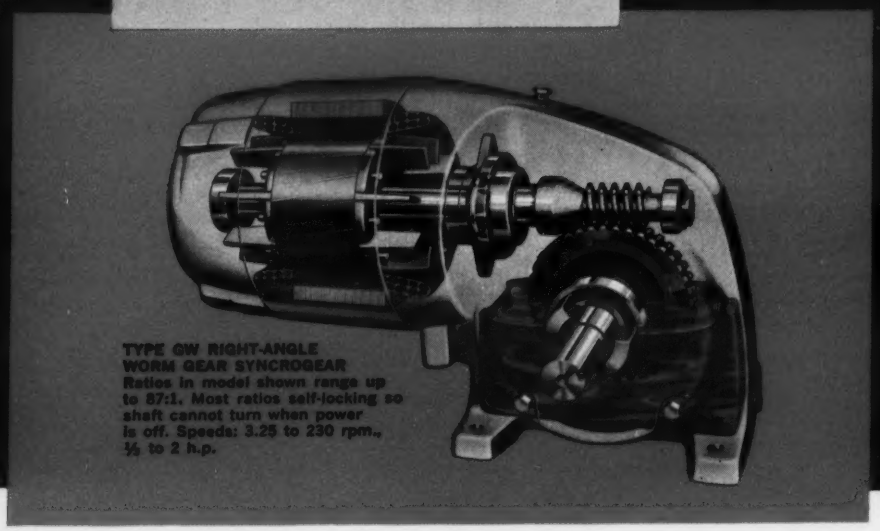
DOUBLE-REDUCTION (GWB)—ratios up to 354:1—with second stage helical gear train—provides steady, multiplied torque and extremely slow speeds for applications in which power-speed precision is important. High-torque case is constructed to resist extra pull.



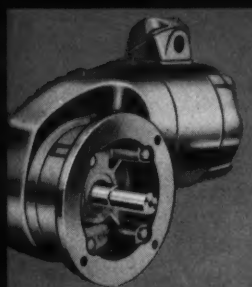
VARIABLE-SPEED—makes instant speed changes by merely turning dial—Combination of GW Syncrogear with U. S. Varidrive Motor to provide speed control with worm-gear reduction.



SINGLE PHASE (GWR)—can be connected to any 110 or 220 volt line—equipped with capacitor. Single phase is available from ⅓ to 1½ h.p. Single phase is also available in double reduction Type GWB-R.



TYPE GW RIGHT-ANGLE WORM GEAR SYNCROGEAR
Ratios in model shown range up to 87:1. Most ratios self-locking so shaft cannot turn when power is off. Speeds: 3.25 to 230 rpm., ½ to 2 h.p.



FLANGE-MOUNTED (GWV)—for direct connection to driven machine—Footless. Can be direct-connected vertically or on side with shaft right or left.

U. S. SYNCROGEAR/right-angle, worm-gear type

The most economical gearmotor is the right-angle worm-geared type, and it is often the most logical choice for compactness. U. S. SYNCROGEAR MOTORS, Type GW, offer you such features as compact, strong pyramidal construction and rugged cast-iron case, providing rigidity to handle overhung loads, high starting torques; U. S. Motors' own precision-made gears; one-piece motor worm-gear shaft eliminating connection of motor and worm shafts; and no-rib construction for easy cleaning. Available ⅓ to 2 h.p. For trouble-free operation... long life... specify: U. S. SYNCROGEAR MOTORS, RIGHT-ANGLE WORM-GEAR TYPE.

U.S. ELECTRICAL MOTORS INC.
Los Angeles 54 (P.O. Box 2058), California — Milford, Conn.

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